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

the pathogens most commonly isolated (22% of all cases), followed by coagulase-negative staphylococci (CNS) (12%), coliforms (7%), and others (5%). The quarter risk to receive primary IMM antibiotic therapy because of study assignment was only 28.2% for CB (vs 100% for PC) ($P < 0.01$). When accounting for cases not treated initially that ended up being treated in the CB group, the proportion of quarters treated was 35.9% ($P < 0.01$). Overall, the average number of IMM antibiotic tubes per CM quarter case was 1.13 and 3.29 for CB and PC, respectively (DiffPC (95% CI) = -2.16 (-2.49 to -1.83); $P < 0.01$). Consequently, there was a reduction of 1 day in days out of the tank for cases assigned to CB (DiffPC (95% CI) = -1.02 (-1.44 to -0.56); $P < 0.01$). It was 5.72 and 6.73 days for CB and PC, respectively. Days to clinical cure were not different between treatment programs (DiffPC (95% CI) = 0.32 (-0.17 to 0.82), $P = 0.21$). Including in the calculation cases that did not receive IMM therapy, the mean days to clinical cure were 3.45 and 3.12 days for cases assigned to CB and PC, respectively. Also, the proportion of quarters with bacteriological cure was not different (ORPC (95% CI) = 1.0 (0.49 to 2.06); $P = 0.98$). It was 76.9% and 77.1% for cases assigned to the CB and PC, respectively. Similarly, there was no difference on new intramammary infection risk between groups (ORPC (95% CI) = 0.78 (0.41 to 1.48); $P = 0.74$) at 20.2% and 24.6% for cases assigned to the CB and PC, respectively. Interestingly, CM recurrence in the same quarter between 14 and 60 days after the first case in cases assigned to CB happened half as much as that for cases assigned to PC (ORPC (95% CI) = 0.44 (0.23 to 0.84); $P < 0.01$). The risk of CM recurrence was 12.8% and 25.2% for cases assigned to CB and PC, respectively. Similarly, risk of removal from herd was half for cases assigned to CB, although this was only a trend and not statistically significant (ORPC (95% CI) = 0.48 (0.18 to 1.14), $P = 0.09$). The risk of removal from herd within 21 days after CM was 7.1% and 14.4% for cases assigned to CB and PC, respectively.

Significance

The selective treatment of only CM cases from which environmental streptococci were isolated by a professional laboratory resulted in an approximate two-thirds reduction both in the number of cases treated and the number of IMM tubes used, as well as a reduction of 1 day out of the tank. Furthermore, the withholding of antibiotic treatment did not increase the time for milk to return visibly normal or affect bacteriological cure or new infection risk. Interestingly, CM recurrence was significantly lower and removal from herd tended to be lower when only environmental streptococci were treated with IMM antibiotics.

Evaluation of an automated milk leukocyte differential test for detecting intramammary infection in early- and late-lactation quarters and cows

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Introduction

The dairy industry must develop mastitis control practices that can use antimicrobials judiciously while maintaining or improving udder health. One opportunity is the adoption of selective dry cow therapy (SDCT) programs that treat only infected quarters or cows. Another approach may be to identify and apply selective treatment to infected quarters soon after calving. However, for such programs to be successful, we require on-farm tests with sufficient accuracy and utility to differentiate infected from uninfected quarters or cows. The objective of this study was to describe the diagnostic test characteristics of an automated milk leukocyte differential (MLD) test to identify intramammary infection (IMI) in early-lactation (EL) and late-lactation (LL) quarters and cows.

Materials and Methods

Eighty-six EL (7 to 15 DIM) and 90 LL (277 to 721 DIM) cows were sampled from 3 midwest herds with bulk tank SCC values between 333,000 to 390,000 cells/mL. On the day of sampling, aseptic duplicate quarter samples were collected for bacterial culture, and quarter milk samples were collected into the MLD test sample collection device. MLD testing of quarter milk samples was completed within 3 to 8 hr of sample collection as per the manufacturer's directions using the "Research Mode" setting. MLD results were stored on a hard drive, and later transferred to the manufacturer (AAD, Durham, NC). Here they were interpreted according to a proprietary algorithm, and then quarter level results (positive/negative) reported back to the primary investigator as though the test had been set in the "3 minute Smart Mode",