Effect of the Treatment of Clinical Mastitis Based on On-farm Culture on Secondary Therapy, Days to Clinical Cure, Days out of Tank, Mastitis Recurrence, Somatic Cell Count, Milk Yield, and Culling

A. Lago[1], *DVM, DABVP;* **S. Godden**[1], *DVM, DVSc;* **R. Bey**[1], *PhD;* **P. Ruegg**[2], *DVM, MPVM;* **K. Leslie**[3], *DVM, MSc*
[1]*College of Veterinary Medicine, University of Minnesota, St. Paul, MN 55108*
[2]*University of Wisconsin, Madison, WI 53706*
[3]*Department of Population Medicine, University of Guelph, Guelph, ON N1G 2W1*

Introduction

Lago *et al* (2008) reported that the adoption of an on-farm culture (OFC) system to guide strategic treatment decisions resulted in a reduction in antibiotic use, but no decrease in bacteriological cure risk for mild or moderate cases of clinical mastitis (CM). The objective of this abstract is to describe the effect of the aforementioned treatment program on other short and long term outcomes after CM.

Materials and Methods

Cows with mild or moderate CM from eight Holstein herds in MN, WI, and ON were randomly assigned to either a) a positive-control (PC) or b) a culture-based treatment group (CB). Quarter cases assigned to PC received immediate on-label intramammary (IMM) treatment with cephapirin sodium (Cefa-Lak®, Fort Dodge, IA). Quarters assigned to CB were not treated until OFC results were available after 24 h of incubation (Minnesota Easy Culture System – Biplate. University of Minnesota, St. Paul, MN). Quarters in the CB group that showed gram-positive growth or a mixed infection were treated with cephapirin sodium (Cefa-Lak®, Fort Dodge, IA). Quarters in the CB group that showed gram-negative or no growth did not receive IMM therapy. Outcomes evaluated included a) risk to receive secondary treatment (SECTX): initiation of antibiotic treatment for cases not treated initially or extended therapy for cases treated initially; b) days to clinical cure (DCC); c) days out of tank (DOOT); d) risk and days to CM recurrence in the same quarter (RECUR); e) and f) linear SCC (LSCC) and milk yield (MILK) using monthly DHIA test records; and g) risk and days to removal from herd (CULL) for the rest of the lactation after enrollment (up to one year). Generalized Mixed Models were used for the analysis of dichotomous outcomes (SECTX), Cox Frailty Models for time-to-event outcomes (DCC, DOOT, RECUR and CULL), and General Mixed Models for continuous outcomes (MILK and LSCC). Herd was included as a random effect. A significance level of $P < 0.05$ was used.

Results

The study enrolled 422 cows affected with CM in 449 quarters. Of those, 214 cows (229 affected quarters) and 208 cows (220 affected quarters) were assigned to PC and CB groups, respectively. The odds to receive SECTX were 2.3 times higher for cases assigned to PC than for cases assigned to CB [$OR_{PC} = 1.9$, 95% $CI_{PC} = (1.4, 2.7)$, $P = 0.001$]. SECTX was administered in 36% and 19% for cases assigned to PC and CB, respectively. The DCC hazard ratio (HR) was not significantly different between both treatment programs [$HR_{PC} = 1.2$, 95% $CI_{PC} = (0.9, 1.8)$, $P = 0.21$]. The mean DCC was 2.7 and 3.2 days for cases assigned to PC and CB, respectively. There was a tendency for fewer DOOT for cases assigned to CB than for cases assigned to PC [$HR_{PC} = 0.9$, 95% $CI_{PC} = (0.7, 1.0)$, $P = 0.08$]. The average DOOT was 5.9 days and 5.2 days for cases assigned to PC and CB, respectively. RECUR was not different between both treatment programs [$HR_{PC} = 1.2$, 95% $CI_{PC} = (0.9, 1.6)$, $P = 0.20$]. The risk and average days after enrollment to RECUR was 35% and 78 days, and 43% and 82 days for cases assigned to PC and CB, respectively. LSCC difference esitmations (Diff) [$Diff_{PC} = 0.1$, 95% $CI_{PC} = (-0.2, 0.5)$, $P = 0.44$] and MILK [$Diff_{PC} = 0.7$, 95% $CI_{PC} = (-0.9, 2.3)$, $P = 0.41$] were not significantly different between the treatment programs. The estimated daily LSCC and MILK after enrollment were 4.2 and 66.1 lb (30.0 kg), and 4.4 and 67.7 lb (30.7 kg) for cows assigned to PC and CB, respectively. CULL was not different between both treatment programs [$HR_{PC} = 1.1$, 95% $CI_{PC} = (0.7, 1.6)$, $P = 0.56$]. The risk and average days to CULL was 28% and 160 days, and 32% and 137 days for cases assigned to PC and CB, respectively.

Significance

Use of OFC to guide strategic treatment decisions resulted in less SECTX, no differences in DCC, almost one day reduction in DOOT, no differences in RECUR, LSCC, MILK and CULL post-enrollment. These findings added to the previously reported benefits of a reduction in antibiotic use, but no significant decrease in bacteriological cure. The cost-benefit of adopting the program will be evaluated.