

Clinical outcome comparison of immediate blanket treatment versus a delayed pathogen based treatment protocol for clinical mastitis in a New York dairy herd

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Introduction

Clinical mastitis (CM) has a high incidence on dairy farms, creating economic losses due to discarded milk, reduced production, premature culling, and treatment costs. Current practice on many dairies is the immediate treatment of all cases with intramammary (IMM) antibiotics or “blanket therapy.” The use of a treatment protocol based on pathogen results about 24h after mastitis detection has potential to sufficiently and efficiently reduce IMM antibiotic use. The purpose of this study was to compare blanket therapy to a pathogen-based treatment protocol.

Materials and Methods

All CM cases were assessed for inclusion at a 3,500 cow commercial dairy in central New York between December 2014 and April 2015. Using a randomized design, cows with clinical scores (CS) of 1 or 2 were assigned to either the blanket or culture-based therapy group. Cows with a CS=3, prior treatment with antibiotics (<15d), or impending sale were excluded. Samples were collected via sterile technique and retrieved daily by Quality Milk Production Services (QMPS). Results were available after 24h by direct upload onto farm computers. Standard cultures were performed by QMPS according to NMC guidelines for identification of aerobic organisms and *Mycoplasma* spp. Cows in the blanket therapy group received 1 tube of ceftiofur hydrochloride (Spectramast) into the affected quarter for 5d according to label. Cows in the culture group received no treatment for the first 24h. Upon upload of results, the following protocol was automatically assigned via DC305: *Staph* spp., *Strep* spp., or *Enterococcus* were administered an IMM tube of cephapirin sodium (Today) once every 12h for 2 treatments. Cows positive for other organisms or no growth received no treatment. A cow with positive cultures for *Prototheca*, *Mycoplasma*, *Staph aureus*, or *Strep ag.* was culled. Pen moves and dates milk became clinically normal were recorded daily. Continuous variables included d to return to visibly normal milk, d out of the tank, linear score (LS) 8-35d post treatment, and test day milk (8-

35d post treatment). Binary data included removal from the herd <30d or <60d post CM. A cow was followed until she was culled, the end of her lactation, or 6mo after CM. Continuous outcome variables following CM were analyzed by ANOVA in JMP Pro 11.0.0 (SAS Institute, 2013). Distribution of binary response variables were analyzed for treatment effect using two-by-two tables and Pearson’s Chi-squared tests.

Results

A total of 489 CM events were enrolled. Two hundred forty-seven cows were assigned to the culture group and 242 cows to the blanket therapy group. One hundred sixty-four cows in the culture group (33.5%) received no treatment, while 83 (17%) received IMM cephapirin sodium. One hundred thirteen cows were not enrolled due to the severity of their CM (13% of CM). No significant differences existed between blanket therapy and culture-based therapy cows in days to clinical cure (culture: n=163, mean=5.4 d; blanket: n=235, mean=5.1 d; $P=0.25$). No differences were observed in test day milk production between groups (culture: n=216, mean=76.7 lbs; blanket: n=216, mean=74.4 lbs; $P=0.32$). Average LS on test day was for culture was 4.3 (n=214) and 4.2 for blanket (n=210) ($P=0.58$). Days out of the bulk tank was significantly higher for the blanket therapy group than the culture group (culture: n=184, mean=7.0 d; blanket: n=240, mean=8.9 d; $P<0.001$). Risk of culling before 30 d post-enrollment was the same for both groups (OR=0.88; $P=0.85$), as was risk of culling prior to 60 d (OR=1.20; $P=0.56$).

Significance

Sixty percent of moderate and mild CM cases would not have been treated if all CM trial cows were enrolled in a pathogen based protocol. This strategic method of treatment decreased milk withholding time by 2 d for those cows that were treated, with no difference in days to clinical cure, milk yields, and LS post-mastitis event; nor additional risk of culling in the days following.