Treatment Decisions and Clinical Mastitis Cure Rates Monitoring Using DHIA SCC Data

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Introduction

Somatic cell count (SCC) cure reflects both bacteriological cure and resolution of tissue inflammation. Farmers receive premiums and penalties related to the sale of somatic cells in fluid milk, thus SCC cure has some advantages over other monitors of treatment success or failure. Although pathogen specific patterns of SCC change during clinical mastitis have been well described (de Haas *et al*, 2002), use of SCC cure in commercial herds has been poorly documented.

The objective of this paper was to report on the use of a method to assess clinical mastitis cure using SCC in monthly tested Dairy Herd Improvement Association (DHIA) recorded dairy herds with records of clinical mastitis events.

Materials and Methods

Data from monthly individual cow DHIA SCC tests and clinical mastitis events in 11 commercial dairy herds in Wisconsin, ranging in herd size from 49 to 1359 cows, for a minimum period of one year, were merged in an Excel spreadsheet. Herd mean annual weighted SCC ranged from 190,000/ml to 664,000/ml.

A clinical mastitis event was defined as a cow case, with one or more quarters affected. Where more than one cow case occurred for the same cow between DHIA tests, all cases were treated as a single cow case.

For each herd, prior to the clinical event, cows were categorized by SCC status into three categories. These were: fresh cows before 1st DHIA test, cows <200,000/ml SCC at the previous test and cows >200,000/ml at the previous test.

Cure was defined as return to a SCC <200,000/ml at either the first or second SCC test after the clinical event. Cumulative Cure Rate (CCR) represents the proportion of cow cases of mastitis that cured.

Data were analyzed using the MIXED procedure of SAS using a weighting to compensate for differing numbers of cows at each DHIA test. A significance level of $P<0.05$ was used.

Results

Data were available from 1949 clinical cow cases of mastitis. Mean (range) CCR for all 11 herds and SCC sub-groups was 55% (44–61%). There was no significant herd effect ($P=0.599$), but SCC status prior to the clinical event was significant ($P<0.001$). CCR for cows >200,000 at the previous test was significantly different from that for fresh cows and for cows <200,000 at the previous test ($P<0.001$). Least squares means (SE) CCR for cows >200,000 was only 33.0% (2.1), compared to 62.6% (2.8) for fresh cows and 65.5% (2.2) for cows <200,000.

Although culture data for each case were not available, predominant pathogens treated in all herds were coliforms and environmental streptococci. CCR for fresh cows and cows <200,000 at the previous test exceeded 60% on average, over a wide range of treatment protocols, using both label and extra-label intramammary therapy. All clinical cases were treated with antibiotic in all herds, with no effort to identify gram-negative infections and withhold antibiotic therapy as described by Hess *et al*, (2003).

CCR was poor for cows >200,000 at previous test. These infections are likely due to environmental streptococci and *Staphylococcus aureus* in the majority of cases (de Haas *et al*, 2002). This finding explains the poor cure rates reported by herds which switch from a non-antibiotic therapy program to one using antibiotics, with the treatment of many cows which are chronically infected. In order to manage such a transition with success, treatment of new clinical infections should be the focus of initial therapy.

Significance

We suggest a 'history-based approach' to clinical mastitis therapy.

Clinical mastitis in cows <200,000 at previous test may be successfully treated with label therapy.

Cows >200,000 at previous test should be subjected to the mastitis California Test (CMT) in all four quar-

ters when they become clinical. With such poor cure rates in this group there are clearly two options for managing clinical mastitis in these cows:

1. Do not treat with antibiotics.

2. Treat more aggressively with antibiotic than new infections.

Extended duration therapy should be considered for all positive quarters for the first case of mastitis during a lactation. For relapse cases in this group, particularly in cows with more than one quarter positive to CMT or beyond first lactation, greater than 100 days in milk (DIM) and not yet pregnant, a no-antibiotic treatment approach may be considered.

Treatment of Persistent *Escherichia coli* Mastitis on a Large Dairy

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Introduction

In our previous clinical mastitis study (Ackerman, AABP 2003), 39% of *Escherichia coli* intamammary infections persisted more than 21 days. Since *E. coli* is isolated from less than 20% of clinical cases, persistent *E. coli* infections make up less than 10% of clinical mastitis cases. A protocol that includes treatment of all cows to address these persistent infections is neither practical nor cost-effective. Currently, many larger farms are not treating *E. coli* mastitis with antibiotic therapy. However, these infections can be serious and painful with a persistent high milk somatic cell count. In herds where milk from clinical mastitis cases is cultured and pathogens identified before treatment, use of antibiotics for *E. coli* infections may be both practical and cost-effective. These *E. coli* cases meet the AMDUCA criteria for extra-label treatment of an infection that threatens the animal's well-being and does not respond to approved intramammary antibiotics. In this study, we evaluated two antibiotic treatments for their effect on persistent *E. coli* infections.

Materials and Methods

Milk from clinical mastitis cases was cultured at the farm and antibiotic treatment was withheld for 18-24 hours until the pathogen was identified (Hess, AABP 2003). Gram-positive pathogens were treated with the routine intramammary antibiotic protocol, and *E. coli* cases (n=30) were assigned to a treatment group by randomized block table. Treatment groups included: 1) no antibiotic treatment; 2) 30 ml of intramuscular tetracycline once daily for three days; or 3) intramammary infusion of 200 mg ceftiofur once daily for three days. Milk was observed at each milking for clinical response, and milk was cultured between days 7-14 and 21-28, if the quarter remained in production. Culture data was analyzed for *E. coli*, lost quarters and number of cows removed from herd for mastitis presence.

Results

Mean time to re-culture was 14 days for tetracycline-treated cases, and nine days for ceftiofur- and non-treated cases. When both treatments were combined there was no difference in recovery of persistent *E. coli* for both treated and non-treated cases. In the 30 cases of *E. coli*, the combined antibiotic treatments had 33% (7/21) persistent *E. coli,* which was the same as the non-treated cases, 33% (3/9). Persistence was lower for ceftiofur (20%) than tetracycline (45%), but the number of quarters and cows lost to production was 38% for treatment cases and 33% in the non-treated cases. However, cows with persistent infections made up the majority of cows and quarters lost to production for the treated cases. Cows were re-cultured between six and 14 days before re-entering the milking herd for salable milk. In treated cows, isolation of *E. coli* on third culture at 21-28 days was the same as second culture (7-14 days post-treatment). Infection that cleared early after treatment remained clear, while *E. coli* presence at seven days persisted past 21 days.

Significance

Treating *E. coli* cases with systemic tetracycline or intramammary ceftiofur did not significantly lower