

Southeast Dairy Producer's Check-Off Program Research Summary

Using Pretreatment Somatic Cell Counts to Enhance Mastitis Cure Rates

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Implications

The present data supports that quarters with lower SCC prior to antibiotic treatment of mastitis are more likely to successfully cure than quarters with high SCC prior to treatment. Additionally, the type of mastitis at the time of infection, the pathogen causing the infection, lactation number, DIM, and infection chronicity should be considered when making future treatment decisions. Low cure rates identified in the cure study may be a result of the ineffectiveness of the treatment regimen. Further investigation of associations between pre-treatment SCC, the antibiotic regimen chosen, and antibiotic duration.

Methods

Milk from mammary quarters of lactating Holstein and Jersey cows ($n = 52$) presenting with clinical mastitis or subclinical mastitis were aseptically collected at the UGA Teaching Dairy (day 0, D0). Intramammary treatment with 10 mL of lactating cow antibiotic therapy, ceftiofur hydrochloride (Spectramast[®] LC) was infused into the infected quarter 1x/day for 5 days. Milk samples were plated on blood agar plates and incubated at 37 °C. After 24- and 48-h of incubation, plates were examined prior to further diagnostic tests where necessary. If samples did not display bacterial growth on D0 after incubation or displayed any other pathogen growth not of bacterial origin, they were removed from the study. Samples were collected 14 (D14) and 28 days (D28) post-antibiotic treatment. Bacterial cultures and SCC enumeration were performed on each day as described above, and the success or failure of the antibiotic was determined. Samples on D14 and D28 had to have the same pathogen growth as seen on D0, or they were removed from the study. A quarter was officially labeled as “Cured” if milk from both D14 and D28 were free of bacterial growth and labeled “Failed to Cure” if bacterial growth was detected in milk on one or both days. The SCC and cure rates were statistically evaluated and differences were considered significant at $P \leq 0.05$ using Tukey’s pairwise comparisons.

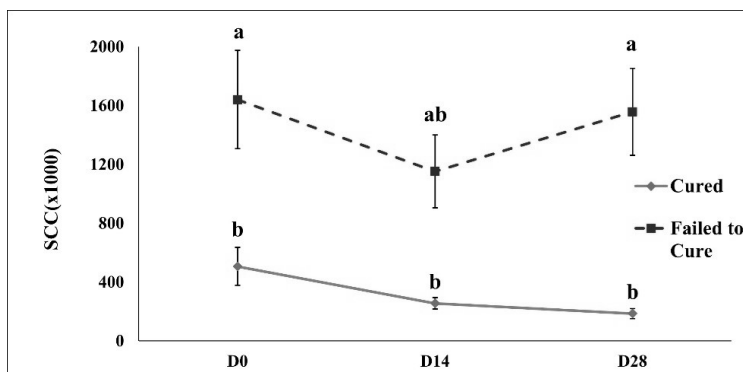
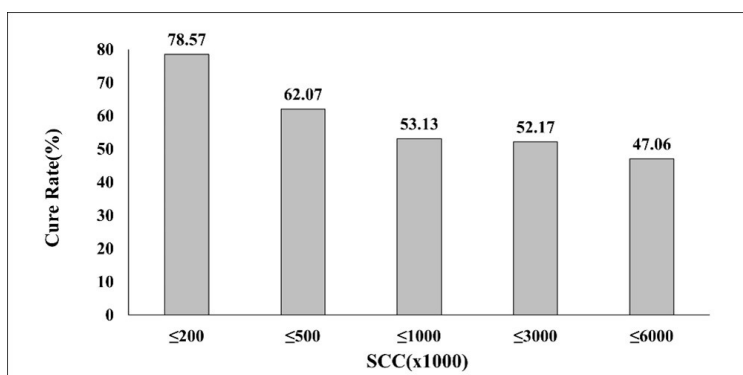
Results

Overall, the D0 pre-treatment SCC of quarters that were cured by D28 was significantly lower (507,041 cells/mL \pm 127.86 SEM) than quarters that failed to cure (1,640,392 cells/mL \pm 333.28 SEM) (Figure 1). In quarters that cured, SCC was lower on both D14 and D28, in contrast to a decline on D14 and then increase by D28 in quarters that failed to cure. Quarters that failed to cure had significantly higher cell

counts on D28 than quarters that successfully cured. The overall cure rate of enrolled cases in the present study was 46.2%. Results showed that as D0 SCC increased, the cure rates following a 5 d antibiotic therapy significantly decreased (Figure 2). When the SCC was >500,000 cells/mL, the bacteriological cure rate dropped to 0.00%, but cure rate increased again to 46.15% when SCC was between 1 and 3 million cells/mL.

No significant differences were observed in D0 SCC when evaluating specific pathogens or days in milk. Minor pathogen infections demonstrated the most successful cure rate (60.9%), followed by major pathogens (36.4%), and gram-negative pathogens (33.3%). Antibiotic cure rates based on days in milk demonstrated that mid-lactation cows had the highest cure rate (58.3%), followed by early-lactation cows (45.0%) and late-lactation cows (40.0%), with a trending decrease in cure rates.

The average D0 SCC of clinical mastitis cases and new infections that failed to cure was significantly greater than quarters that cured. A lower antibiotic cure rate (28.57%) was seen for clinical mastitis compared to the cure rate for subclinical mastitis of 52.6%. Mature cows (3+) had higher D0 SCC in quarters that failed to cure compared to those that cured. Cows in 1st lactation had a cure rate of 40.0%, 2nd lactation cows had a cure rate of 41.2%, and cows in 3+ lactations had a cure rate of 70.0%. The antibiotic cure rate for new infections was 42.9% versus a cure rate of 60% for chronic infections was 60.0%.



References of Published Work

Williamson, J.R., T.R. Callaway, E. Rollin, and V.R. Ryman. 2022. Association of pre-treatment somatic cell counts with bacteriological cure following diagnosis of intramammary infection. *Res Vet Sci.* 152: 537-545.

