Automated milk leukocyte differential diagnosis and treatment of subclinical mastitis in early lactation

M.E. Hockett, PhD; **R.R. Rodriguez**, MS; **M.E. Payne**, MS
Advanced Animal Diagnostics, Morrisville, NC 27560

Introduction

Mastitis is one of the most costly disease conditions that affect dairy cattle, costing the dairy industry billions of dollars annually. Subclincial mastitis has been demonstrated to be a disease state equal to or greater than clinical mastitis in regard to the impact it may have on milk production, reproduction, and profitability of a cow. Diagnosis of this disease state requires diagnostic testing, as clinical signs are not visible. Recent advancements allow for automated milk leukocyte differentials to be performed on-farm to be used as a means of diagnosing subclinical mastitis. The objective of this study was to determine the impact of on-farm, automated milk leukocyte differential (MLD) (QScout®MLD) testing for subclinical mastitis in early lactation and treatment on infection rates, milk production and somatic cell count (SCC).

Materials and Methods

The study was performed from late fall 2013 to spring 2015 on an 8,000 cow Holstein farm in the northwest. Cows (n=1,470) that were 7 to 14 days-in-milk (DIM) were tested by MLD. Quarters of cows diagnosed to be infected in any quarter(s) were randomly assigned to receive an extra-label treatment (TRT) of ceftiofur hydrochloride (Spectramast-LC™; Zoetis) per standard procedure on the farm or no treatment (NOTRT). Cows diagnosed to be negative in all quarters received no treatment and were assigned to the NEGATIVE group. Quarter milks were collected at 10 and 45 DIM for SCC and microbiological analysis. Monthly milk and SCC data were recorded from DHIA records. Chi-square analysis was used to determine differences in culture rates. The GLIMMIX procedure of SAS was used to determine treatment effects on 305 day mature equivalent (ME) milk and SCC.

Results

Parity, DIM, total leukocyte count (TLC) and culture positive rates were similar between TRT and NOTRT groups at enrollment. TLC and culture positive rates were lower for quarters in the NEGATIVE group. Quarter infection rate by culture was lower 30 days post-treatment in TRT (10.3%) than in the NOTRT (20.6%; P=0.0002). 305d ME Milk production (P=0.0013) was lower and SCC (P<0.0001) was higher for cows in the NOTRT group than for TRT and CON. The impact of treatment on milk and reproductive performance were dependent on level of quarter inflammation and each parameter was maximized at a different level of inflammation.

Significance

Diagnosis of subclinical quarters using MLD testing and subsequent 5-day treatment of quarters diagnosed as positive 7 to 14 DIM resulted in increased milk production and reduced SCC throughout lactation compared to cows that were not treated following positive diagnosis. The segregation of pathogens of particular management interest to quarters with greater signature of inflammation may allow for programs to tailor treatment to maximize antibiotic cures and decrease the effects of inflammation on reproduction. Automated differential diagnosis provides producers an on-farm tool to guide treatment of subclinical mastitis to improve cow productivity and profitability.