Body Temperature and White Blood Cell Count in Dairy Cows During the First Ten Days After Calving

S. A. Wagner, *DVM, PhD;* **D. E. Schimek,** *MS;* **F. C. Cheng,** *PhD*
North Dakota State University

Introduction

The postpartum period is a time of physiological stress for high-producing dairy cows. Close monitoring of recently calved cows enables the earliest possible intervention when illness develops. An objective of this study was to evaluate the use of rectal temperature as a diagnostic tool in postpartum cows. As immune suppression is common in postpartum dairy cows, another objective was to compare white blood cell counts in the postpartum period between cows that developed clinical disease and those that did not.

Materials and Methods

Between the months of September, 2005, and April, 2006, 50 dairy cows at the North Dakota State University Dairy Research Unit had a complete physical examination performed every 4 hours, beginning within 4 hours after calving and continuing for 10 days or until the time of diagnoses of illness. A blood sample was collected and a complete blood count was performed daily on each cow. Cows were considered ill if they developed a rectal temperature of 40.3°C or greater in the absence of other clinical signs or if they developed other clinical signs of illness. Cows that became ill were removed from further participation in the study at the time of diagnosis.

Results

Of the 50 cows in the study, 15 were diagnosed with an illness and 35 remained healthy. Meaningful statistical comparisons of rectal temperature could only be made for the first 5 days after calving; no difference in mean rectal temperatures was found when healthy and sick cows were compared (P = 0.85). However, when compared with healthy cows, sick cows were significantly more likely to have at least one observed temperature greater than 39.5°C (P = 0.04) or 39.7°C (P = 0.04) in the first 3 DIM. Among healthy cows, mean rectal temperature was lower at 8 am than at 4 pm (P = 0.04), but there were no significant differences between other time points. Differences in mean rectal temperature by time of day among sick cows did not achieve statistical significance (P = 0.46). Among the cows that remained healthy during the study period, if only 8 am observations are included, 9 of 35 (26%) of cows that did not become ill had at least one observation of rectal temperature greater than or equal to 39.5°C, and 3 of 35 (9%) had at least one observation of rectal temperature greater than or equal to 39.7°C during the first 10 DIM.. Mean white blood cell counts were compared for the first 5 days after calving and found to be lower in sick cows than healthy cows for the first 3 DIM (P = 0.05), due to lower neutrophil counts in sick cows (P = 0.03). Cows that remained healthy had mean white blood cell counts above the normal reference range on the first 2 days after calving and mean neutrophil counts above the reference range on the first 4 days after calving, while cows that became ill had white blood cell counts in the normal range throughout the first 5 days after calving and neutrophil counts in the normal range starting on the second day after calving.

Significance

The results of this study suggest that relying on a rectal temperature greater than 39.5°C or 39.7°C to diagnose illness in postpartum dairy cows, in the absence of other clinical signs, will cause considerable over-diagnosis of illness. Moreover, the cows in this study were maintained in an unheated environment during cold months in a northern climate. Rectal temperatures in healthy cows would probably be higher in warmer months or climates. Neutrophil counts in healthy cows in the immediate postpartum period may be higher than levels previously considered normal, which may indicate effective compensation for decreased neutrophil function in such cows. Cows that have white blood cell counts within the normal reference range during the immediate postpartum period may be at an increased risk of developing disease when compared to cows with increased white blood cell counts postpartum.