Evaluation of Keto-Test in Urine and Milk for the Detection of Subclinical Ketosis in Periparturient Holstein Dairy Cattle

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Introduction

Subclinical ketosis causes significant economic loss to producer by decreasing milk production and increasing risk of periparturient disease. The dairy industry needs a cowside test to monitor periparturient dairy cattle for subclinical ketosis. The objective of this study was to determine the sensitivity, specificity and predictive values of the semi-qualitative Keto-Test in periparturient dairy cattle. This test was previously evaluated (Geishauser *et al*, *J Dairy Sci*, 2000) and shown to have a sensitivity and specificity of 80% and 76%, respectively, using a cut-point of 100 µmol/L beta-hydroxybutyrate (BHBA) or greater as a positive. However, in that evaluation tests were not performed prior to parturition or in the immediate periparturient period.

Materials and Methods

Dry cows and primiparous heifers from Elora Dairy Research Centre, Elora, Ontario, Canada, were enrolled at one week prior to the expected calving date. Blood and urine samples were taken at enrollment and at calving. Blood, milk and urine samples were taken at one week postpartum and two weeks postpartum. Blood samples were analyzed for BHBA concentrations at the Animal Health Laboratory, University of Guelph, Guelph, Ontario, Canada. Preliminary data for 138 cows has been summarized. Sensitivity, specificity and predictive values for the Keto-Test at four sampling points were calculated using a cut-point of 100 µmol/L BHBA or greater as a positive (see Table 1). A cut-point of 1400 µmol/L of BHBA was used for all calculations.

Table 1. Sesitivity and specificity for Keto-Test (≥100 µmol/L BHBA) in milk and urine at four different sampling points.

Sample time	No. animals sampled	No. BHBA Positive	Fluid	Sensitivity (%)	Specificity (%)	PPV (%)	NPV (%)
-1 week	79	1	Urine	100	94	17	100
Calving	72	3	Urine	67	86	27	98
+1 week	121	22	Milk	95	71	42	99
+1 week	71	15	Urine	93	54	35	97
+2 weeks	127	19	Milk	95	67	33	99
+2 weeks	88	14	Urine	100	65	35	100

Results and Conclusions

This evaluation demonstrates that the Keto-Test could be a useful tool for producers to monitor subclinical ketosis. The urine test prior to, or at, parturition does not appear useful given the condition's low prevalence. During lactation the urine test suffers from low specificity and offers very little advantage to milk. The Keto-Test shows promise in the early periparturient period as a tool to identify animals that may be at increased risk for the development of periparturient disease.

Health Impact of a Stall Divider Raised Nine Inches in Side-lunge Stalls for 900 Cows

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Introduction

Clinicians associate deficits in freestall design with cows lying in alleys, increased dirtiness, increased mastitis, and increased risk of entrapment injury. However, there is a paucity of published case reports that document the risks. This report documents mastitis and injury rates as three different stall configurations were introduced sequentially to a herd of approximately 1,000 Holstein cows.

Materials and Methods

Sand-based stall beds measuring 7.5 ft in length had been used for five years. These short stalls require that cows lunge into the adjacent stall when rising. The lower bar of the cantilevered stall dividers measured 10 inches above and the neck rail 37 inches above the sand surface, respectively. Regulatory officials requested construction of a manure-holding pit and cessation of daily hauling and application of manure to frozen fields. Concerns about potential difficulties with sand-laden manure in a pit led the owners to retrofit the stalls. The sand was removed, the stall-base filled with concrete, and a mattress and plastic brisket board was installed. The existing cantilever dividers were elevated so the neck rail was 45 inches above the mattress surface. Directly above the brisket board, the lower cantilever bar measured 18.75 inches above the mattress, which is believed to be too high for cows to lunge across with comfort. Within weeks of completion, the owners of the dairy were aware of increasing problems associated with the stall modification. Approximately 6 months after the initial stall modifications, the dividers were replaced with dividers with a lower bar at 8 inches height, while maintaining the neck rail. Somatic cell count (SCC) data from Dairy Herd Improvement Association and clinical mastitis treatment records on the dairy were collected for 18 months prior to the earlier stall modification and continued for 24 months after the corrective stall modification. Statistical analysis was performed on the herd mastitis data and injury rates through each of the three time periods.

Results

The initial stall modification resulted in significant increases in the proportion of cows with SCC>200,000 and significant increases in the number of cows culled or dead per month from injuries. The corrective stall modification resulted in significant reductions in the proportion of cows with SCC>200,000 and cows culled for stall-based injuries and deaths.

Conclusion

The stall modification that raised the lower divider rail nine inches up into the side lunge space resulted in significant increases in the prevalence of mastitis and culling for injuries due to stall entrapment.