

Results

Subclinical hypocalcemia (≤ 8.5 mg/dL) prior to treatment administration was 58% for control and treatment ($P = 0.96$). One hour after bolus administration, serum calcium concentration was significantly greater in treated cows at first (8.65 vs 8.01 mg/dL; $P < 0.001$) and second (8.71 vs 8.23 mg/dL; $P < 0.001$) bolus administration. However, no significant differences were observed prior to second bolus administration (8.23 vs 8.01 mg/dL; $P = 0.12$). There was a treatment effect on urine pH (7.0 control vs 6.1 treatment; $P < 0.001$) and a significant treatment by time interaction ($P = 0.02$). No treatment effects were observed on ketosis

prevalence (26.7%; $P = 0.97$), defined as ≥ 1.4 mmol/L of BHBA in blood at least once during the sampling period or endometritis (47%; $P = 0.93$).

Significance

These results suggest that postpartum total serum calcium concentration can be increased with oral bolus administration; however, serum calcium concentration might not be maintained by the time the second bolus is administered. Based on urine pH, this study also demonstrated that Quadri-CalMINI oral Ca supplementation successfully acidified cows.

The association of prepartum blood magnesium concentration with postpartum subclinical hypocalcemia

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Introduction

Advances in dairy cattle nutrition and management have been able to significantly minimize macromineral imbalances capable of contributing to the development of clinical disorders in the periparturient period. Despite these improvements, subclinical disorders still influence dairy cow health and performance, as the hormonal and metabolic challenges associated with the transition period influence macromineral homeostasis. Although the association of subclinical hypocalcemia (SCH) with early lactation health events has been described, little is known regarding the association of prepartum magnesium status with postpartum health and production. Therefore, the primary objective of this study was to describe the association of prepartum blood magnesium concentrations with the risk of postpartum SCH development, as well as the risk of diagnosis of retained placenta, metritis, hyperketonemia, and displaced abomasum.

Materials and Methods

A retrospective cohort study was carried out in 2 large dairy herds located in New York State from April until November, 2015. This project was part of a larger observational study requiring repeated blood sample collection throughout the periparturient period. To be included in this study, cows were required to have blood samples collected approximately 1 week prior to expected parturition, within 4 h after calving, and at 2 days-in-milk (DIM); additionally,

cows could not have received any calcium treatment within 48 h post-parturition. Plasma samples from 1 week before calving, within 4 h of the postpartum, and at 2 DIM were sent to the Animal Health Diagnostic Center at Cornell University for mineral panel analysis. Prepartum subclinical hypomagnesemia was classified as plasma magnesium concentrations ≤ 0.8 mmol/L. Postpartum SCH was classified as plasma total calcium concentration ≤ 2.1 mmol/L. Health events (retained placenta, metritis, and displaced abomasum) for the first 60 DIM were extracted from the on-farm herd management software (DairyComp305, Valley Agricultural Software, Tulare, CA). Diagnosis of hyperketonemia was made by the research group based on blood β -hydroxybutyrate (BHB) measurement with the Precision Xtra meter (Abbott Laboratories, Lake Bluff, IL) at 3, 5, 7, and 10 DIM. Cows were classified as hyperketonemic if any of the BHB concentrations were ≥ 1.2 mmol/L. Results were analyzed using chi-squares and relative risk calculations performed on SAS version 9.4 (SAS Institute Inc., Cary, NC).

Results

A total of 301 animals met the study inclusion criteria (92 from herd A, and 209 from herd B), being 34.5%, and 65.5% of primiparous and multiparous, respectively. Thirty-seven animals (17 primiparous and 20 multiparous) were classified as subclinically hypomagnesemic during the prepartum period, and 109 animals (2 primiparous and 107 multiparous) were classified with SCH within 4 h of calving.

Sixty animals (55%) remained SCH at 2 DIM. Subclinical hypomagnesemia classification prepartum was not associated with the risk of cows being classified with SCH within 4 h of calving (RR=0.85; 95% CI: 0.68-1.06; P=0.2), or remaining SCH at 2 DIM (RR=0.9; 95% CI: 0.71-1.3; P=0.42). Additionally, there was no association of subclinical hypomagnesemia prepartum with the risk of subsequent retained placenta, metritis, hyperketonemia, or displaced abomasum. Outcomes of conception to first service and average milk production remain pending.

Significance

For the cohort of cows under study, prepartum plasma magnesium levels were not associated with the risk of cows being classified with SCH or with early lactation health events. However, the low prevalence of subclinical hypomagnesemia prepartum and the inclusion of primiparous animals in the cohort may have impacted the power to detect associations. In addition, prepartum plasma magnesium levels for the herds under study were higher than anticipated.

Comparison of four electronic cowside tests for diagnosing hyperketonemia in dairy cows

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Introduction

The objective of this study was to evaluate 4 cowside ketone meters for use in on-farm β -hydroxybutyrate (BHB) monitoring of hyperketonemia (HYK) in transition dairy cows.

Materials and Methods

Blood samples taken from 250 Holstein cows between 262 days pregnant and 15 days-in-milk were evaluated on 4 different cowside BHB meters: Precision Xtra, TaiDoc, Nova Max, and Nova Vet. Samples were screened using the Precision Xtra and tested on the remaining 3 meters if the sample BHB concentration fell into 4 pre-determined ranges. A total of 89 samples were used for analysis. Performance of each meter was compared to plasma BHB concentrations determined by a gold standard spectrophotometric Randox assay.

Results

All meters demonstrated Pearson correlation coefficients greater than 0.95. The Precision Xtra and TaiDoc

meters were 100.0% sensitive and 73.5% specific at a BHB concentration cut point of 1.2 mmol/L. The Nova Vet and Nova Max meters had sensitivities of 94.9% and 74.4% and specificities of 91.8% and 100.0%, respectively, at the same cut point. Sample variability from the gold standard was lowest for the Nova Vet meter when evaluated using a Bland Altman graph with a mean BHB difference of 0.08 mmol/L. Trends in variability were noted with the Precision Xtra and Nova Max meters resulting in increasing variability for both meters at higher plasma BHB concentrations, with mean BHB differences of -0.34 and 0.26 mmol/L, respectively. The coefficient of variation was <10% for the Precision Xtra, TaiDoc, and Nova Vet meters, and <15% for the Nova Max meter. All meters showed some variation in performance at blood BHB concentrations >3.0 mmol/L.

Significance

We conclude that the TaiDoc and Nova Vet meters are acceptable alternatives to the Precision Xtra meter for use in on-farm testing for monitoring and treatment of HYK.