

The Effect of Injectable Butaphosphan and Cyanocobalamin on Postpartum Serum Beta-Hydroxybutyrate, Calcium, and Phosphorus Concentrations in Dairy Cattle

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Introduction

Catosal® (Bayer, Shawnee Mission, Kansas, USA) is a sterile solution containing 10% butaphosphan and cyanocobalamin (vitamin B12), and is intended to prevent or treat deficiencies of these nutrients. Supplemental vitamin B12 may enhance gluconeogenesis through its role in methylmalonyl-CoA mutase. Phosphorus plays important roles in the hydrogen buffering system in the blood, is a critical component of nucleic acids, and is clinically important due to its role in postparturient paresis in dairy cattle. The objective of this study was to assess the effect of two 25 mL injections of Catosal® on the serum BHBA, calcium, and phosphorus concentrations of cows in the early postparturient period. (Originally published in *J Dairy Sci*, Vol 93, No. 3, 2010.)

Materials and Methods

Cows from four herds (n=1,122) were stratified by parity and assigned by block randomization to either treatment or control groups receiving 25 mL of Catosal® or 25 mL of sterile water by subcutaneous injection (SQ) on the day of calving and one day later. Coded treatments were used to blind personnel and investigators with respect to treatment assignment. A blood sample was collected from each cow within 24 hours of calving (before treatment was given) and again between three and 10 days-in-milk and tested for serum BHBA concentration. Non-parametric approaches were used to compare group medians and paired comparisons of different time points. Comparison of the proportions of cows in each group with a serum BHBA >1,200 µmol/L during the week after calving were made using a chi-square test, and multivariable modeling of the dichotomized BHBA concentration was performed using logistic regression. All tests were performed assuming a two-sided alternative hypothesis and *P*-values < 0.05 were considered statistically significant.

Results

When analyzing data from all parity groups, there was no difference between the median BHBA concen-

trations of treated and control groups pre-treatment (*P* = 0.61) or during the first week postpartum (*P* = 0.42). There was an increase in the median BHBA concentrations of both groups between the first and second measurements (*P* < 0.001). There was no difference in the proportions of cows in the treatment or placebo groups with a serum BHBA > 1,200 µmol/L during the week after calving (68/565 [12.0%] and 81/557 [14.5%], respectively; *P* = 0.22). In a multivariable analysis of the dichotomized BHBA levels, there was no significant effect of treatment, but parity, BCS, dystocia, and retained placenta were all significant predictors. The odds of having a serum BHBA > 1,200 µmol/L during the week after calving were significantly higher for cows in their third or higher lactation compared to first-lactation cows, for cows with a BCS > 4 compared to those with a BCS < 3, for cows that had experienced dystocia, and for cows that had a retained placenta. A sub-group analysis was performed for cows that were in their third or higher lactation, due to their higher risk of hyperketonemia. While there was no difference in pre-treatment BHBA concentrations (*P* = 0.67), treated mature cows had a lower median BHBA than placebo during the week after calving (*P* = 0.047) and the proportion of mature cows with a serum BHBA > 1,200 µmol/L during the week after calving was significantly lower in the treated group than in the placebo group (48/244 [19.7%] vs 66/228 [29.0%], *P* = 0.019). Treated mature cows had 40% lower odds of having a serum BHBA > 1,200 µmol/L during the week after calving than those receiving placebo, after adjusting for the other variables.

Significance

Certain subgroups of cows were more likely to experience elevated BHBA levels postpartum; fat cows, cows with retained placenta, older cows, and cows with longer dry periods were all more likely to have hyperketonemia. The injection of Catosal® on the day of calving and one day later may decrease the prevalence of subclinical ketosis during the week after calving in mature dairy cows, but not in first- and second-lactation animals.