Effect of a Monensin Controlled-Release Capsule Inserted At Dry-Off On Energy Status In Transition Holstein Cows Fed Typical Florida Diets

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Introduction

The transition period in dairy cows (three weeks before and after calving) is characterized by tremendous physiological and metabolic changes. During this period, cows experience some degree of hypocalcemia, increased levels of non-esterified fatty acids (NEFA) and ß-hydroxybutyrate (BHB), and decreased levels of glucose. Consequently, if prevention is not employed, cows will be at a higher risk of developing calving-related disorders (CRD).

Monensin is an ionophore that affects rumen fermentation, resulting in increased proprionic acid production and a concurrent decrease in the molar proportion of acetate and butyrate. Consequently, monensin as a controlled-release capsule has been used to prevent ketosis and other disorders in dairy cattle.

The hypothesis of the present study was that transition dairy cows supplemented with monensin and fed typical Florida diets would positively improve energy status. Therefore, the objective of this study was to determine the effect of a monensin controlled-release capsule inserted at dry-off on concentrations of NEFA, BHB and glucose during the transition period of Florida dairy cows.

Materials and Method

The study was conducted on a commercial dairy farm with 3000 milking cows located in north central Florida, with a milk rolling herd average of 23,540 lb (10,700 kg). Lactating cows were housed in a dry-lot system and fed the same total mixed ration (TMR) three times a day, except postpartum transition cows which received a diet higher in forage (NDF). Cows were dried-off between 50 and 70 days before expected parturition (BEP) and maintained in a dry-lot until 21 days BEP. They were fed a typical Florida dry cow diet and moved 21 days BEP to a different pen to initiate their prepartum transition period. They were housed in a dry-lot with adequate feed-bunk space and shade. Twice a day they received a diet containing citrus pulp with a dry matter (DM) content of 54.5%, crude protein (CP) of 17.7%, (NEl) of 1.69 Mcal/kg DM, acid detergent fiber (ADF) 25.1%, neutral detergent fiber (NDF) 36.2% and a (DCAD) of -51.7 mEq/kg DM using the equation DCAD (mEq)= (Na + K) – (Cl + S).

After calving, cows were moved to a postpartum lot and fed a diet higher in forage NDF.

During July to August 2001, 60 cows were randomly assigned at dry-off to either a treatment or a control group. Treated group (n=30) received orally a capsule of monensin (releasing 335 mg of monensin daily for 95 days, CRC Rumensin®, Elanco Animal Health, Guelph, ON, Canada). Control cows (no capsule, n=30) were randomly matched by parity. Number of animals per treatment was calculated expecting a reduction in the concentrations of BHB from 1000 to 850 ± 52 µmol/L at 14 days postpartum (95% confidence, 80% of power).

Blood samples were taken from the coccygeal vein on the day of assignment (50 to 70 days BEP) before receiving any treatment; on day 21 BEP; at calving; and at 7, 14 and 21 d after calving at the same time of the day. Blood samples were centrifuged at 4000 rpm for 10 minutes. Plasma and serum were separated, stored in plastic tubes and frozen at – 20°C (-4° F) until analysis was performed.

Plasma NEFA, serum BHB and serum glucose were determined by enzymatic-colorimetric methods. Data for blood metabolites were analyzed constructing mixed models for repeated measures. Statistical analysis was conducted using the Proc Mixed procedure of SAS 7.0.

Results

In primiparous cows, neither BHB, glucose, nor NEFA differed between groups ($P > 0.05$). However, in treated multiparous cows, glucose was significantly higher than in control cows at parturition ($P \leq 0.05$),

and tended to be higher during the early postpartum period ($P \leq 0.10$).

In conclusion, a monensin controlled-release capsule inserted at dry off did not significantly affect NEFA and BHB, but did slightly increase blood glucose concentrations in Holstein transition cows fed diets containing citrus pulp.

Significance

Although monensin is not allowed in lactating dairy cows in the United States, results of the present study offer valid information for use in dairy cattle under sub-tropical conditions, if monensin is approved for future use in lactating dairy animals.

Comparison of J-5 Vaccinates and Controls for Clinical Severity, Milk Production Change, Etiologic Agent, and Survival in the Herd Following Naturally Occurring Cases of Clinical Mastitis

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Introduction

Naturally occurring cases of clinical mastitis (CM) were studied among J-5 vaccinates or controls on three commercial dairy farms. Measures of clinical severity, milk production change and survival in the herd were evaluated for differences between the two groups. Particularly the study looked at protection against being culled with mastitis as the primary reason, including time-to-event analysis.

Materials and Methods

Cows having completed at least one previous lactation were eligible for inclusion in the study, conducted on three commercial dairy farms over 20 months. Cows were excluded if during the last three months of the previous lactation they had a somatic cell count (SCC) >1,000,000/ml, or if at time of drying off they had any teat ends that scored as poor using a visual scoring system, or had any clinical signs of mastitis. Cows were randomly allocated as J-5 bacterin vaccinates or controls. Vaccine was administered by investigators subcutaneously in the supramammary region just before cows were dry, and again four weeks later, during the mid-dry period.

Evaluation of computerized daily milk weight recording on both study farms showed that 97% of all cows' milk weights were recorded correctly in the computer data. Some cows had multiple CM episodes in the same quarter. Any such episode that occurred within five days of end of treatment (or end of milk withholding) was considered a chronic case of mastitis. Any episode that occurred from six to 14 days after recovery from the earlier episode was considered chronic if the same etiologic agent was isolated from both episodes. If a different mastitis pathogen was isolated or the episode occurred more than 14 days after recovery, it constituted a new CM case. All new cases of CM occurring during the first 200 days in milk (DIM) were included.

Training and standardization for CM detection, use of a cowside scale for clinical severity, and aseptic sample collection was provided to milking personnel at the beginning of the study. Farm personnel collected aseptic samples for microbiological culture from quarters with signs of CM. National Mastitis Council laboratory procedures for diagnosis of bovine intramammary infections were followed.