Comparing colostral bovine rotavirus and bovine coronavirus antibodies in primiparous and multiparous cows vaccinated pre-partum with two different multivalent vaccines

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Introduction

Neonatal calf diarrhea (NCD) is a prevalent problem globally and in the U.S., data from NAHMS indicates that 50% of pre-weaned dairy heifer deaths are due to NCD. Bovine rotavirus (BoRV) and coronavirus (BoCV) are common viral causes of NCD. Dry cows are frequently vaccinated against these pathogens to enhance colostral antibody content. Studies have shown that vaccinating cows increases colostral antibodies but few published studies exist comparing different vaccines in this regard. The objective of this trial was to compare colostral antibody titers from cows given one of 2 commonly used multivalent vaccines compared to cows that were left as unvaccinated controls.

Materials and methods

A commercial dairy in California not vaccinating cows for NCD was used in this study. Both heifers entering their first lactation (28) and animals entering their second or greater lactation (32) projected to be 8-9 weeks prior to calving and not receiving any other vaccinations at the same time were eligible. Animals were randomly enrolled to receive either a dose of Scour Bos™9 (SB, 25 animals), ScourGuard® 4KC (SG, 25 animals) or simply left unvaccinated (UVC, 10 animals). A booster vaccination was given 3 weeks later for the SG group and 4 weeks later for the SB group (which was Scour Bos 4) according to label. All animals were bled prior to vaccination, prior to their booster vaccination and 2 weeks prior to calving. Serum was separated at a local veterinary clinic shortly after collection and frozen for future analysis. At calving, colostrum from each animal was aseptically collected and frozen in a chest freezer at the dairy. All frozen serum and colostrum samples were sent overnight to RTI (Brookings, SD) for analysis. Viral antibody titers against BoCV (Nebraska strain) and BoRV (Nebraska strain, G6P1) were determined by virus neutralization using the constant virus-decreasing serum assay ran in 2 replicates. Neutralization tests were read by specific immunofluorescence with the endpoint defined as the reciprocal of the highest sample dilution with no fluorescing cells. The laboratory was blinded to treatment and all results were reported back in an Excel spreadsheet.

Results

All cows enrolled in the study ended up calving and having colostrum collected. Of the 240 BoCV titers (60 cows, 3 blood samples, 1 colostrum sample), 3 from the final bleeding were reported as "> 4096" all from the SB group. These values were set to 4096 for analysis. Likewise, there were 3 BoRV titers reported > 4096, 1 in the second serum sample and 2 in the pre-calving sample that were set to 4096 for analysis, all from the SB group. One colostrum titer greater than 25,600 for the SB group was set to 25,600. All titers were Log2 transformed and a one-way analysis of means (Tukey-Kramer HSD test for pairwise comparison, JMP 15) was used at the 3 time points for serum as well as colostrum for each virus. Prior to vaccination there were no differences ($P > 0.05$) in serum titer levels between the 3 groups with all animals having low titers for both viruses. For the second time point, both SB and SG treatment groups had significantly higher titers than UVC animals for both viruses ($P < 0.01$). The SB animals were significantly higher than SG animals for BoRV at the second time point ($P < 0.01$). In the pre-calving samples for BoCV, SB was significantly greater than SG ($P < 0.01$), which was significantly greater than UVC ($P < 0.01$). For BoRV, there were no differences between SG and SB groups but both were greater than UVC ($P < 0.01$). In colostrum, the SB had significantly higher titers than the SG group ($P < 0.01$) for BoCV, which was not different than UVC ($P = 0.54$). For colostral BoRV, there were no differences between SB and SG groups ($P = 0.20$) but both were significantly higher than UVC ($P < 0.01$).

Significance

This trial demonstrated that vaccination with Scour Bos resulted in significantly higher colostral antibodies than UVC for both BoCV and BoRV and higher colostral antibody titers than the SG group for BoCV.

