sample testing, a collaborator laboratory purified nucleic acid from bovine fecal samples using the MagMAX Total Nucleic Acid Isolation Kit. MAP bacterium was physically and chemically lysed by homogenizing the fecal supernatant using the FastPrep®-24 homogenizer in the presence of lysis solution. Five thousand copies/reaction of XenoDNA Control was spiked into the lysis solution of each purification to monitor for inhibition. Samples were then processed using the MagMAX Express-96 Deep Well Magnetic Particle Processor. 8 µL of extracted nucleic acid was tested using the VetMAX-Gold MAP Detection Kit on the 7500 Fast Real-Time PCR system according to the Instructions for Use.

Results

The results of testing show the VetMAX-Gold MAP Detection Kit produced diagnostic sensitivity and specificity values of 96.2% and 96.4%, respectively, when testing individual fecal samples as compared to culture. For individual samples, the predictive value of a positive test was 93.8% and predictive value of a negative test was 99.3%. Pooled sample testing with the VetMAX-Gold MAP Detection Kit resulted in diagnostic sensitivity and specificity values of 96.2% and 100%, respectively, as compared to culture. For pooled samples, the predictive value of a positive test was 100% and predictive value of a negative test was 96.0%.

Significance

This study indicates that DNA isolated from a diagnostic bovine fecal sample, tested with the VetMAX™-Gold MAP Detection Kit, provides an economical and rapid solution for MAP detection from both individual and pooled fecal samples. The results of this study are under review by APHIS' Center for Veterinary Biologics to support Thermo Fisher Scientific's Biological Product License application.

Effect of Acetate Ringer's solution with or without dextrose intravenously administered to diarrheic calves

K. Tsukano, *DVM*[1]; **S. Kato**, *DVM*[2]; **K. Suzuki**, *DVM, PhD*[1]; **Y. Nishi**, *DVM*[1]; **S. Sarashina**, *DVM, MS*[2]; **T. Shimamori**, *DVM*[1]
[1]*The School of Veterinary Medicine, Rakuno Gakuen University, 582 Midorimachi, Bunkyoudai,Ebetsu, Hokkaido, 069-8501, Japan*
[2]*Donan-NOSAI, Donan Agricultural Mutual Relief Association, 25-16 Misugityo, Yakumo, Futami-gun, Hokkaido, 049-3114, Japan*
[3] *The Department of Veterinary Clinical Sciences, Ohio State University, Columbus, OH 43210*

Introduction

Neonatal diarrhea remains the most common cause of death in beef and dairy calves. Intravenous (IV) fluid therapy is an important method for decreasing mortality associated with diarrhea in calves. Although Acetated Ringer's (AR) solution is superior for correcting moderate metabolic acidosis and circulation volume in calves with dehydration, it cannot improve the negative energy balance. Fluids using AR with 5% dextrose (ARD) may be useful for the treatment of calf diarrhea in order to prevent catabolism. The objectives of this study were to evaluate the effects of ARD on rehydration and metabolism restoration in calves with diarrhea.

Materials and Methods

A total of 16 diarrheic calves with a mean age of 9.6 ± 3.1 days (from 5 to 14 days old) were used in this study. *Cryptosporidium parvum* was isolated from 81.3% (13/16) of the diarrheic calves. A 14-gauge catheter was inserted into the right jugular vein for fluid infusion. The calves were randomly assigned to the AR (n=8; IV infusion of AR) or ARD groups (n=8; IV infusion of ARD). Calves received 100 ml/kg of 1 of the fluids, at a flow rate of 25 ml/kg/hr. The initiation of the infusion of the fluid was designated as time 0. Venous blood samples were collected at 0 (pre-infusion), 0.5, 1, 2, 4, and 24 hours after initiation of fluid infusion. Venous blood samples were anaerobically collected in a heparinized 1 ml syringe from the left jugular vein, and the tips of the syringes were capped after collection. The blood samples were analyzed for β-hydroxybutyrate (BHBA) by an automatic analyzer (Precision Xceed, Abbott Japan), and for blood gases, Ht, BE, Hb, sodium concentration, potassium chloride, and glucose by an automatic analyzer (i-STAT 1, USA). Changes in relative plasma volume (rPV) were calculated from Hb and Ht using accepted formulas. The data are expressed as the means ± standard deviation. Within groups, mean values for each dependent variable were compared with the pre-values, us-

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ing ANOVA. Measured dependent variables were compared among groups for each sample collection period using the Student's-test or Mann-Whitney *U*-test after an *F*-test. The significance level was at $P<0.05$.

Results

All calves observed had clinical diarrhea accompanied with dehydration and metabolic acidosis. The rPV of the AR and ARD groups increased progressively during the fluid infusion period, reaching 179.0 ± 58.6% and 144.3 ± 22.9% at the end of the fluid infusion, respectively ($P<0.05$ by ANOVA). The sequential change of rPV for AR and ARD was not significantly different between the groups. The BE in the 8/8 AR and 8/8 ARD groups were slightly increased compared to the pre-infusion values until the end of fluid infusion, with these average values reaching -12.3 ± 4.4 mM and -14.4 ± 4.6 mM at the end of infusion, respectively, but these variables were not significant within the groups. The BHBA of the AR group was slightly increased compared with the pre-infusion values until the end of fluid infusion, reaching 0.38 ± 0.34 mM at the end of infusion, but these variables were not significant within the group. In contrast, ARD infusion induced progressive and significant decreases in BHBA, which reached 0.14 ± 0.07 mM at 0.5 hrs after initiation of fluid infusion, and was then maintained between 0.10 and 0.06 mM throughout the fluid infusion ($P<0.05$ by ANOVA). The sequential changes of BHBA for the ARD group were significantly greater than those for the AR group ($P<0.05$).

Significance

The IV infusion of 100 ml/kg of AR and ARD, at a flow rate of 25 ml/kg/hr, did not induce any abnormal clinical signs caused by plasma expansion. In this study, IV infusion of AR and ARD, was found to be effective in increasing plasma volume and correcting BE. While IV infusion of ARD prevented catabolism, AR infusion induced catabolism accentuation. This suggests supplying dextrose maintains glycometabolism and inhibits increasing BHBA caused by lipolysis. These results suggest that ARD infusion may be more beneficial than conventional treatments for wasting diarrheic calves with dehydration and metabolic acidosis.

Serum iron concentration in dairy cattle with acute coliform mastitis

T. Shimamori, *DVM*[1]; **K. Suzuki**, *DVM, PhD*[1]; **Y. Nishi**, *DVM*[1]; **M. Tsuchiya**, *PhD*[2]; **T. Suzuki**, *DVM, MS*[3]; **A. Niehaus**, *DVM, MS, DACVS*[4]

[1]*The School of Veterinary Medicine, Rakuno Gakuen University, 582 Midorimachi, Bunkyoudai, Ebetsu, Hokkaido 069-8501 Japan*

[2]*Microbial Solutions, Charles River, Charleston, SC 29407*

[3]*Ishikari Agricultural Mutual Aid Association, Ebetsu, Hokkaido 067-0055 Japan*

[4]*The Department of Veterinary Clinical Sciences, Ohio State University, Columbus, OH 43210*

Introduction

Coliform mastitis caused by *Escherichia coli* and/or *Klebsiella pneumoniae* is typically associated with clinical and acute mastitis, which is one of the most frequent causes of culling. Acute coliform mastitis (ACM) shows local and systemic inflammation and is generally recognized as the cause of fatality. Serum iron concentration has been evaluated as a marker of inflammation in dogs, cats, and horses, but limited data exist about whether serum iron concentration can be used to diagnose acute inflammation in cattle. To our knowledge, no comparative studies are available on the serum iron concentration from dairy cattle with and/or without ACM. Thus, the aim of this study was to evaluate a relationship between serum iron concentrations and prognosis of ACM in dairy cattle.

Materials and Methods

The endotoxin challenge study was performed on six 2-month-old healthy Jersey calves, weighing 309.9 ± 79.8 lb (140.9 ± 36.3 kg). All calves received intravenous bolus doses at 2.5 μg/kg of O111:B4 LPS in 10 ml of each autologous serum via the jugular vein. Blood samples (10 ml each) were withdrawn from the contra lateral jugular vein before being endotoxin challenged. Serum samples were stored in separate tubes 12, 24, and 48 hrs after being challenged. Serum iron concentrations were measured by the nitroso-PSAP method using an auto-analyzer. A prospective case-control study was performed by recruiting cattle with ACM. Forty-seven Holstein Friesian dairy cattle with ACM and 30 that were healthy with no mastitis were enrolled in the clinical trial. ACM was diagnosed clinically based on the results of the clinical examination by a veterinary practitioner. The definitive diagnosis of

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