

Effect of Nitazoxanide on Cryptosporidiosis in Experimentally Challenged Neonatal Dairy Calves

T.L. Ollivett, DVM¹; D.V. Nydam, DVM, PhD²; D.D. Bowman, PhD³; J.A. Zambriski, DVM²; M.L. Bellosa, BS²; T.C. Linden, BS²

¹Dept. of Clinical Sciences, College of Veterinary Medicine Cornell University, Ithaca, NY 14853

²Dept. of Pop. Medicine and Diagnostic Sciences, College of Veterinary Medicine Cornell University, Ithaca, NY 14853

³Dept. of Microbiology and Immunology, College of Veterinary Medicine Cornell University, Ithaca, NY 14853

Introduction

Cryptosporidium is a zoonotic protozoan that is most often diagnosed in association with diarrhea in one to three week old dairy calves. There are neither consistently effective nor approved antimicrobials for treatment in animals. The objective of this study was to test nitazoxanide (NTZ) as a treatment for cryptosporidiosis in experimentally challenged dairy calves.

Materials and Methods

A randomized, controlled and blinded trial was performed using Holstein bull calves obtained from a large commercial dairy. All births were attended by study personnel and calves fed 4L of heat-treated colostrum within one hour of birth. Calves were randomly assigned to treatment or placebo group and maintained for a 32 feeding (16 day) study period. Twenty-three calves were enrolled with three lost to follow up. Thirteen calves were assigned to the treatment group and seven calves to the placebo group. All calves were inoculated with 1×10^6 , 90% viable *Cryptosporidium parvum* oocysts at feeding 3. Treatment was a commercial NTZ product and the placebo was the carrier of the same product. NTZ was administered at 1.5 grams twice a day for five days in the milk replacer. NTZ or placebo treatment began after feeding 10 and when the fecal score was greater than one out of three. Outcome measurements included twice daily fecal and health scores and once daily oocyst count by an immunofluorescent antibody assay. Data were analyzed by non-parametric and time to event methods.

Results

Measures of passive transfer of antibodies, initial body weight and onset of oocyst shedding were not different between treatment and control calves. A total of 85% of NTZ treated calves stopped shedding oocysts by the end of the observation period whereas only 15% of the placebo group stopped shedding ($p=0.01$). The median number of feedings with a fecal score equal to three was two in the NTZ group while it was six in the placebo group ($p=0.06$). Calves receiving NTZ were 0.13 times as likely to have severe and sustained diarrhea as control calves (95% CI: 0.02 – 0.98; $p=0.01$).

Significance

Nitazoxanide was shown to reduce the duration of shedding *C. parvum* oocysts and the severity of diarrhea in calves experimentally challenged with *C. parvum*. Calf care-givers could be responsible for fewer doses of oral, intravenous and/or subcutaneous electrolyte solutions which will save time and money for the farm. Shedding of immediately infective oocysts may cause re-infection of the sick calf, infection of neighboring calves, and also pose ground water issues, health risks for the calf care-givers, and visitors to the calf facility alike. Reduction in duration of oocyst shedding will reduce the environmental pathogen load and reduce exposure to other animals and people.