Determination of the role of *Clostridium perfringens* Type A in Intraluminal Intestinal Hemorrhage Syndrome in Dairy Cows

Jennifer Ivany, DVM; David E. Anderson, DVM, MS, Diplomate ACVS; Matthew D. Miesner, DVM
Department of Veterinary Clinical Sciences, College of Veterinary Medicine, The Ohio State University, Columbus, Ohio 43210

Introduction

Intraluminal intestinal hemorrhage syndrome (IIHS) is a relatively recently recognized disease in adult dairy cows which results in obstruction of the jejunum with blood clots and sloughing of the mucosal surface of the jejunum. Many of the affected cows die acutely despite medical and/or surgical treatment. *Clostridium perfringens* Type A is suspected to be involved in development of this disease, as it is commonly cultured from the intestinal contents of affected cows. The objective of this study was to determine if the disease could be reproduced by intraluminal inoculation of a pure culture into the abomasum or the jejunum of normal cows fed high-energy rations.

Materials and Methods

Twelve adult, non-lactating dairy cows were fed a high-energy corn silage-based ration prior to and during the study. On Day 0 a right flank laparotomy was performed and the cows were inoculated with a pure culture broth (10^8 to 10^9 CFU/mL) of *Clostridium perfringens* type A (beta toxin positive) which had been obtained from a clinical case of IIHS in an adult dairy cow. Inoculations were made into the abomasum on six cows and into the proximal jejunum in six cows. Cultures were taken from the target organ prior to inoculation. The cows were monitored daily for physical exam parameters, feed intake, fecal production and consistency, and urine ketone levels. On Day 7, the cows were euthanatized and cultures immediately taken from the abomasum, jejunum, and feces. The pH of the abomasum, rumen, and jejunum contents was also taken. Samples were collected for histopathology from several portions of the gastrointestinal tract. Blood samples were taken for complete blood cell count and serum biochemistry analysis on Day 0 and Day 7.

Results and Conclusions

None of the cows developed clinical signs of IIHS during the course of the study. Seven of 12 cows developed fever for 1 to 3 days after surgery. Six of 12 cows developed loose feces or diarrhea 1 to 3 days after surgery, but this diarrhea did not contain blood. Five of six abomasal samples and one of six jejunal samples were positive for *C. perfringens* Type A prior to inoculation. Eight of 12 abomasal samples, 11 of 12 fecal samples, and 10 of 12 jejunal samples were positive for *C. perfringens* Type A after inoculation. All samples collected from the study cows were beta-toxin negative. Mean pH of rumen was 6.0 ± 0.44, abomasal pH was 2.4 ± 0.57, and jejunal pH was 7.1 ± 0.51. No significant changes were seen on the blood analyses.

From this preliminary study, it appears that inoculation of *C. perfringens* Type A alone cannot induce IIHS. This may be related to state of the bacteria at inoculation (spore vs. vegetative), level of feed intake of the cows, pH of the gastrointestinal tract, stress levels, stage of lactation, or insufficient bacteria concentration. This is a multifactorial disease and is not likely to be reproduced by inoculation alone. All samples collected from the research cows were beta-toxin negative, which may indicate that the bacteria inoculated were destroyed or converted by the body into a non-pathogenic form.