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Calf Note #228 – Recent research on cryptosporidiosis, part 2

Introduction

This is the second Calf Note to summarize recent research in the scientific literature related to cryptosporidiosis in young calves. The first Note is available here. This second Note summarizes research from the University of Guelph and describes the effect of *C. parvum*, rotavirus, and coronavirus on health of young bull calves.

The Research

The researchers monitored 198 bull calves that were raised at a grain-fed veal facility. Calves arrived at the facility at 3-7 d of age from dairy farms in the area (Ontario, Canada). Serum total protein was measured on arrival. Calves were fed CMR and weaned to dry feed at 56-d of age. Thereafter, they were moved into groups until 77 d of age, when they left the study.

Fecal consistency was scored daily for the first 28 days and fecal samples were collected at day 0, 7, and 14. The fecal samples were analyzed for the presence or absence of *Cryptosporidium parvum,* bovine rotavirus, and bovine coronavirus. Also, calves were weighed on d 0, 14, 49, 56, and 77. Number of veterinary treatments, incidence of diarrhea, and mortality were recorded throughout the 77-d measurement period. The researchers evaluated the prevalence of each organism, incidence of diarrhea, mortality, and effects of disease on growth.

The Results

Of the calves enrolled into the study, 25% had total serum protein (measured by refractometer) <5.1 g/dl, which was considered to be failure of passive transfer.

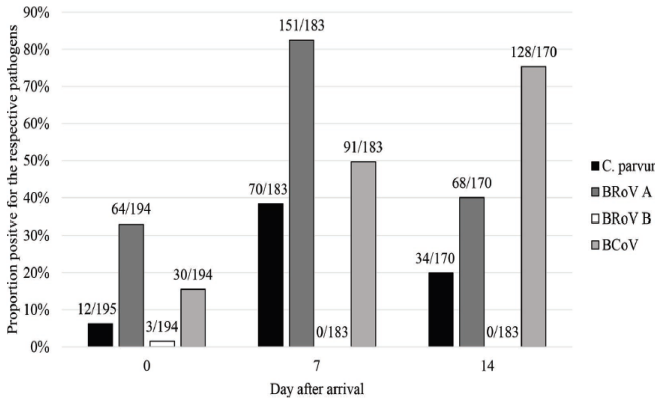

Figure 1. Prevalence of *C. parvum*, bovine rotavirus type A or B (BRoV A, B), and bovine coronavirus (BCoV). From Renaud et al., 2021.

Prevalence of each organism is shown in Figure 1 for days 0, 7, and 14. The prevalence for *C. parvum* was 6, 38, and 20% of samples at each day, respectively.

It's noteworthy in this study that the prevalence of rotavirus was very high throughout the study, as was the prevalence of coronavirus from day 7.

Lots of calves had diarrhea during the trial. Overall, nearly 84% of calves were treated for clinical diarrhea during this study. In addition to *C. parvum*, rotavirus, and coronavirus, the calves suffered from an outbreak of *Salmonella dublin* during the study period. Thus, much of the incidence of diarrhea likely couldn't solely be associated with *C. parvum*, but multiple organisms.

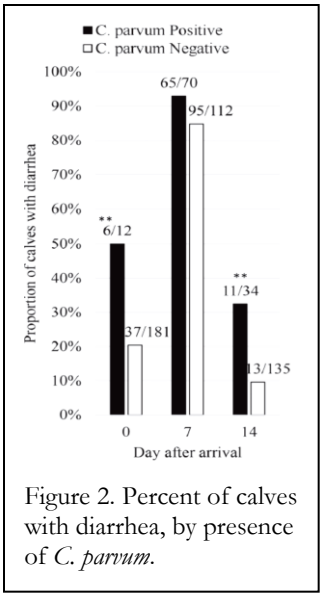

Figure 2. Percent of calves with diarrhea, by presence of *C. parvum*.

In Figure 2, we see that, on d 0, 6 of the 12 calves (50%) positive for *C. parvum* had diarrhea. Only 37 out of 181 calves that were negative crypto had diarrhea, suggesting that the presence of crypto was mainly responsible for the incidence of diarrhea on arrival. However, by 7 d of age >85% of calves – whether positive for crypto or not – had diarrhea. This is likely due to a rapid transmission of all pathogens within the barn and calves suffering from infection with multiple organisms.

What is the effect of infection with *C. parvum* on growth? We can see in Figure 3 that calves that were positive for crypto at 7 d of age were lighter at 49 (- 4 kg) and 77 d (-8 kg) compared to calves that were negative for crypto at 7 d.

These data showed clearly that infection with organisms causing diarrhea resulted in greater disease, mortality, and slower growth. When calves had diarrhea or severe diarrhea, their BW was >15 kg lower compared to calves with low levels of diarrhea.

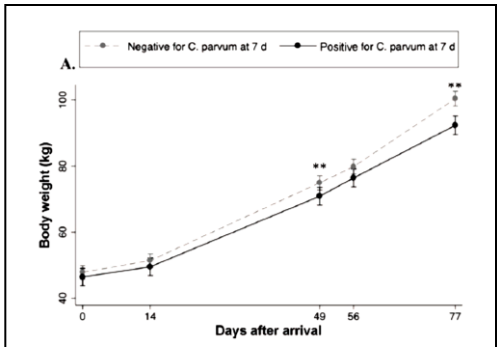

Figure 3. Body weight in calves that tested positive or negative for *C. parvum* at 7 d after arrival.

Summary

Results of the study showed the incidence of infectious organisms, including *C. parvum*, in a grain-fed veal operation. The high incidence of disease is not normal, and reflects the risk associated with grouping and transporting very young calves when they are highly susceptible to infection with enteric organisms. In terms of the effect of *C. parvum*, the data clearly show that when calves are infected with crypto, they will have greater incidence of diarrhea, have higher mortality, and grow slower. That calves were 8 kg lighter at 77 d of the study when they were positive for *C. parvum* at 7 d indicates the long-term effect of this organism on calf growth.

Reference

Renaud, D. L., C. Rot, J. Marshall, and M. A. Steele. 2021. The effect of *Cryptosporidium parvum*, rotavirus, and coronavirus infection on the health and performance of male dairy calves. J. Dairy Sci. 104:2151-2163. https://doi.org/10.3168/jds.2020-19215.

Written by Dr. Jim Quigley (1 September 2021)

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