

Field Study: Exposure to Bovine Viral Diarrhea Virus Pre-weaning Mitigates the Effect of Constant BVDV PI Exposure During the Early Feeding Period

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Introduction

Bovine viral diarrhea virus (BVDV) is a major pathogen involved in the bovine respiratory disease complex (BRD). Immunosuppression induced by BVDV is thought to contribute to BRD, exacerbating secondary bacterial and viral pneumonias. Calves persistently infected (PI) with BVDV maintain the virus in the cattle population and serve as the primary source of transmission within and between herds. The impact that PI calves have on overall feedlot calf health and performance has been shown to be significant. In this field study, calves from one farm, but from different BVDV exposure backgrounds, were monitored after entry into a feedlot in which constant exposure to BVDV virus occurred via presence of PI calves. The objective was to determine if different pre-weaning BVDV exposures mitigated adverse consequences of constant BVDV exposure in a feedlot setting.

Materials and Methods

This field study was conducted with calves that originated from one farm location that was divided into five different management groups. As part of a separate project involving these calves prior to weaning, it was determined that at least one calf in two of the five management groups was a BVDV PI. Two weeks prior to weaning, all calves in each of the five management groups were blocked by date of birth and assigned to one of two vaccination groups: 1) vaccinated with Bovi-Shield GOLD® FP® 5 or 2) NOT vaccinated with Bovi-Shield GOLD® FP® 5. This created four experimental groups: A) exposed to PI's pre-weaning and BVDV-vaccinated pre-weaning (n=37); B) exposed to PI's pre-weaning and NOT BVDV-vaccinated pre-weaning (n=26); C) NOT exposed to PI's pre-weaning and BVDV-vaccinated pre-weaning (n=37); D) NOT exposed to PI's pre-weaning and NOT BVDV-vaccinated pre-weaning (n=38). At weaning, calves were moved to the Michigan State University Beef Cattle Research and Teaching Center where they were all commingled and housed in one pen. Upon arrival,

four BVDV PI calves were immediately introduced into the group. Calves were housed with PI's and fed for 84 days. Morbidity and mortality parameters were calculated. Calves were weighed every 28 days to establish average daily gain.

Results

Pre-vaccination ($P=0.74$) or previous exposure to PI's ($P=0.14$) had no statistically significant impact on the incidence of calves being treated one time for BRD, however, there were numerically less animals treated if BVDV exposure had occurred prior to entry into the feedlot. Pre-vaccination did significantly decrease the incidence of retreatment ($P<0.05$). No differences in mortality rates were detected. Pre-vaccination had a significant effect on average daily weight gain (ADG) of feedlot calves ($P<0.05$). Vaccinated animals had significantly greater ADG than those not vaccinated. This was true regardless of pre-exposure status (i.e. non-significant vaccination by pre-exposure interaction $P=0.42$). Pre-exposure to PI's was also associated with better ADG ($P<0.05$). Pre-exposed calves had greater ADG than non-pre-exposed calves. This was true regardless of vaccination treatment (i.e. non-significant vaccination by pre-exposure interaction $P=0.42$). Due to the fact that the interaction between vaccination and pre-exposure to PI's was not significant, it would suggest that the effects of vaccination and pre-exposure are additive.

Significance

This study supports previous studies that show exposure to BVDV PI's during the feeding period can have negative effects on performance and health. Exposure to BVDV prior to entry into the feedlot can mitigate the negative effects of constant exposure to PI's, thus supporting vaccination programs that are part of pre-conditioning programs. Well designed controlled studies could help to determine if complete elimination of PI's or vaccination alone or a combination of the two are more or less beneficial in reducing BRD risk.