



PROFESSIONAL SERVICES

Boehringer Ingelheim Vetmedica, Inc.

TECHNICAL BULLETIN

Safety and Efficacy of Vaccination of Seronegative Bulls with Express[®] FP 5 Vaccine

INVESTIGATORS

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KEY POINTS

- Vaccination of peri-pubertal bulls with Express[®] FP 5 did not result in prolonged testicular infection due to the cytopathic BVD vaccine virus.
- Vaccination with Express[®] FP 5 prevented prolonged testicular infection of peri-pubertal bulls challenged with a virulent non-cytopathic BVD Type 1a virus.

INTRODUCTION

BVD virus (BVDV) can be shed in the semen of persistently and acutely infected bulls and can survive the freezing and processing of semen for artificial insemination. Virus in semen of acutely and persistently infected bulls may infect susceptible, inseminated cows resulting in reduced pregnancy rates, early embryonic death, abortion and birth of persistently infected calves.

Intranasal inoculation of seronegative, non-viremic, post-pubertal bulls with non-cytopathic BVDV can produce prolonged testicular infections. After acute infection, the non-cytopathic virus could be detected in testicular tissue of some bulls beyond seven months. Research by Givens et al has shown that a single dose of modified live vaccine containing a non-cytopathic, Type 1a strain of BVDV can produce prolonged testicular infections. Although the vaccine prevented testicular infections following a BVD Type 2 challenge 49 days post-vaccination, the non-cytopathic, modified live BVD vaccine virus was detected in testicular tissue as long as 134 days following vaccination.

OBJECTIVE

To vaccinate peri-pubertal bulls with Express[®] FP 5 modified live virus vaccine containing cytopathic BVDV strains Singer and Bolin 296 and evaluate: a) transient shed of cytopathic BVDV in semen, b) risk of prolonged testicular infection due to the modified live vaccine virus, and c) protection against subsequent testicular infection due to challenge with a virulent field strain of BVDV.

STUDY DESIGN

Twenty-two peri-pubertal, beef bulls weighing 602-795 lbs at 9 to 13 months of age were used for the study. All bulls were seronegative to Type 1 and 2 BVDV, and BVDV could not be isolated from serum at initiation of the study. Bulls were stratified by weight and randomly assigned to one of two treatment groups: vaccinated and non-vaccinated controls. On Day 0, Group A (vaccinates) were administered a release dose of Express® FP 5 vaccine containing modified live, cytopathic, BVD Types 1 and 2 viruses. Group B (control group) bulls were administered buffered saline on the same day. At that time, the bulls were placed into their respective groups in isolated pastures. On Day 49 all bulls were commingled immediately prior to viral challenge and maintained together throughout the remainder of the study. On Day 49, all bulls were inoculated with a virulent, non-cytopathic Type 1a strain of BVDV (SD-1) by intranasal aerosol administration. Serum, semen and testicular biopsies were collected to attempt detection of BVDV on various days following vaccination and challenge. To determine the unique identity of each BVDV strain involved in this research study, nucleotide sequencing was performed on RT-nPCR products from individual vaccine strains, intranasal challenge strain and each viral strain detected in semen or testicular samples.

RESULTS

No bulls exhibited clinical signs of BVDV infection after vaccination or challenge.

Results of virus neutralization assays of serum indicated immunization of all bulls in Group A and a notable seroconversion of control bulls after viral challenge.

Following vaccination, semen collected from three bulls on day 7 and one bull on day 10 contained the Singer strain of BVDV. No other virus was detected in semen following vaccination.

Following challenge on Day 49, the non-cytopathic Type 1a BVDV challenge virus was detected in semen from only control, non-vaccinated bulls: three on Day 56, one on Day 63, three on Day 77, and two on Day 98. Challenge virus was detected via PCR in testicular tissue of one bull from the control group on Day 98. No challenge virus was found in semen or testicular tissue of bulls from the vaccinated group.

CONCLUSIONS

Vaccination of peri-pubertal bulls with Express® FP 5 vaccine containing a Type 1a and Type 2 modified live cytopathic BVDV did not result in prolonged shedding of BVD vaccine virus in semen or a prolonged testicular infection. Following vaccination, transient shedding of only the BVD Type 1a vaccine virus was detected in three bulls on day 7 and one bull on day 10. The single dose of Express® FP 5 did prevent testicular infection after subsequent challenge with a virulent field strain of non-cytopathic BVD Type 1a virus.

