Materials and Methods

We investigated the ability of 2 trained dogs to detect cell cultures infected with bovine viral diarrhea virus (BVDV) and to discriminate BVDV-infected cell cultures from uninfected cell cultures and from cell cultures infected with bovine herpesvirus 1 and bovine parainfluenza virus 3. Dogs were trained to recognize cell cultures infected with 2 different biotypes of BVDV propagated in MDBK cells using 1 of 3 culture media. For detection trials, 1 target and 7 distractors (or 8 distractors for blank trials) were placed in petri dishes and presented by a blinded dog handler on a scent wheel.

Results

Detection of BVDV- infected cell cultures by Dog 1 had a diagnostic sensitivity of 0.850 (95% CI: 0.701, 0.942), which was lower than Dog 2 (0.967, 95% CI: 0.837, 0.994). Both dogs exhibited very high diagnostic specificity (0.981, 95% CI: 0.960, 0.993) and (0.993, 95% CI: 0.975, 0.999), respectively.

Significance

These findings suggest that BVDV infection results in expression of unique VOC patterns in cultured cells. Trained detector dogs represent a plausible real-time mobile pathogen sensing technology for viral pathogens.

Effect of injectable castration regimen administered at branding on gain performance, testosterone production, and testicle atrophy in beef bull calves

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Introduction

The USDA estimates 15 million castration procedures are performed annually on bull calves in the United States. Currently, no commercially available injectable sterilization methods exist for beef cattle in the US. Some zinc solutions have been utilized in other in other species, such as companion animals, as an injectable sterilization method. The objective of the current study was to evaluate the effect of a zinc solution as an injectable castration method when administered at 3 dosages to beef bull calves at branding. The effect of the injectable castration method on weight gain, testosterone production, and testicle atrophy was measured.

Materials and Methods

Crossbred beef bull calves (n=31; BW=252 ± 58 lb) were allocated to treatments by bodyweight and birthdate. Twenty-seven bull calves were allocated to 3 injectable castration treatments (n=9 calves/injectable castration treatment) with technicians on-site being blinded to treatments. Treatments were arranged to reflect 3 levels of dosages of the zinc solution (Calivex, Cowboy Animal Health, LLC, Plano, TX). Two bull calves were castrated using knife techniques (negative control) and 2 bull calves were left intact (positive control) until the termination of the study at weaning. Bulls were gathered from pastures, separated from dams, and weighed with no further shrink prior to processing on d 0 and on 28-day intervals until they were weaned from dams on d 122. Blood samples and scrotal measurements were obtained on d 0, 28, 56, 83, and 122. Serum was analyzed for testosterone concentrations. Bodyweight and performance were analyzed using the general linear measures procedure of SAS. Serum testosterone concentrations and thicknesses of the right testicle and scrotum were analyzed using repeated measures analyses. Contrasts were used to compare intact vs castrated, injection vs knife, and linear and quadratic effects for Calviex dosage.

Results

There were no effects (P≥0.64) of castration or castration method on bodyweight or pre-weaning average daily gain. Over the course of the experiment, mean average daily

gain was nearly or slightly above 2 lb/d for the initial 2 periods (d 0-28, and d 28-56), yet declined to 1.63 ± 0.17 lb/d in period 3 (d 56-83) and to 0.33 ± 0.15 lb/day in the final period before weaning (d 83-122). The decline in performance during the late summer was due to seasonal deterioration in forage quality and was not related to treatments imposed. There was a main effect of treatment (P=0.005) on serum testosterone concentrations. Intact bulls had greater (P<0.001) serum testosterone concentrations than bulls castrated with any method, and there were no differences (P=0.66) due to castration method. There was a treatment × day interaction (P=0.0002), whereas on d 0 all treatments had similar serum testosterone concentrations, and on d 122, intact bulls had dramatically greater serum testosterone concentrations than other castrates, regardless of castration method. There were no differences (P≥0.32) in serum testosterone concentrations due to the dosage amounts of Calviex solution. There was no main effect of treatment (P=0.29). There was a treatment × day interaction (P=0.0001), no change in the thicknesses of the scrotum and testis of intact bulls was observed from d 28 to 122; however, the thicknesses of scrotums and testes for calves given all Calviex dosages decreased as the study progressed. There were no differences (P≥0.39) in thicknesses of scrotums and testes due to the dosage amounts of Calviex solution.

Significance

There were no differences in growth performance between calves that remained bulls and calves castrated with any tested method. Serum testosterone and scrotal and testes thickness were greater in intact bulls than in castrated animals by weaning. There were no differences in growth, serum testosterone or scrotal thickness due to the dosage of Calviex used. The injectable castration method resulted in similar serum testosterone concentrations to calves that had been surgically castrated.

Comparison of 2 synchronization protocols in conjunction with delayed insemination in non-responders using sexed semen in beef heifers

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Introduction

The objective of this study was to compare estrus synchronization and fixed-timed artificial insemination (FTAI) protocols in commercial beef heifers to be bred with sexed semen. Secondly, the trial evaluated the benefit of delaying insemination for 24 hours in heifers not demonstrating estrous activity following synchronization and prior to FTAI.

Materials and Methods

One-hundred twenty Angus-cross heifers were stratified by reproductive tract score and randomly assigned to 1 of 2 synchronization protocols: 1) 5-day Co-Synch + CIDR or, 2) 7-day Co-Synch + CIDR. Estrous activity was monitored using a wireless heat detection system. Insemination in both groups was delayed 24 hours in heifers that did not demonstrate estrus in response to synchronization. Heifers demonstrating estrous activity in the 28 days following FTAI were re-inseminated using sexed semen.

Results

The numbers of heifers demonstrating estrus in each group were similar (p=0.47). In Group 1, 10/60 heifers were pregnant to FTAI; 18/60 were pregnant to FTAI in Group 2 (p=0.132). Conception rates for heifers demonstrating, or not demonstrating estrous activity were 29.2% and 16.4%, respectively (p=0.151). More heifers in Group 1 demonstrated estrus and were pregnant to sexed semen in the 28-day period following FTAI resulting in an equal number of pregnancies in both groups at the end of the study.

Significance

This study further confirmed suboptimal pregnancy rates when using sexed semen compared to conventional semen in FTAI protocols, even with estrus detection. Further study is warranted to explore the observed differences in conception rates.