Prevalence of viral and bacterial pathogens in nasopharyngeal and pharyngeal recess regions of Holstein calves with and without signs of clinical bovine respiratory disease


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Aim

The objective of this research was to perform a case-control study of bovine respiratory disease (BRD) in young Holstein calves to evaluate the association of viral and bacterial pathogens from the nasopharyngeal and pharyngeal recess regions.

Methods

An ongoing study at a large calf ranch in central California has currently recruited 202 Holstein bull and heifer calves ranging in age from 35 to 55 days as cases of BRD. These calves had scores of 5 or greater based upon the University of Wisconsin calf respiratory scoring system which evaluated rectal temperature, cough, nasal and eye discharges, and ear position or head tilt. These cases were paired with 202 control calves in adjoining hutches that had minimal signs or no evidence of clinical respiratory disease. Calves were sampled for BRD pathogens prior to treatment. Both mid-pharyngeal and deep-pharyngeal swabs were collected for viral PCR diagnostics that included bovine viral diarrhea virus (BVDV), bovine coronavirus (BCV), bovine respiratory syncytial virus (BRSV), and infectious bovine rhinotracheitis (IBR). An other deep pharyngeal swab was collected for aerobic microbiological and mycoplasma culturing. All calves received a modified-live two-way IBR and parainfluenza-3 intranasal vaccine at one day of age.

The ultimate study goal will be to evaluate 1,000 case-control pairs.

Results

The 202 case-control pairs consisted of 40% heifers and 60% bulls. As expected, clinical signs evaluated by the scoring system and used for recruitment were significantly associated with cases compared to controls (P < 0.001). Microbiological cultures and viral PCR results have been completed on 213 and 148 animal sample submissions, respectively. No growth on microbiological culture was reported for a significantly greater proportion of control calves (69% of 105 samples) while 70% of 108 positive growth cultures were obtained from cases (P < 0.001). All of the 5 positive isolates for Mannheimia spp. and 68% of the 76 positive samples with mixed bacterial cultures were significantly associated with cases (P < 0.04) while the percentages of 21 Pasteurella multocida positive cultures were not significantly different between cases and controls (P > 0.10). Twenty positive mycoplasma cultures were not significantly associated with cases (P > 0.13). PCR results were negative for all samples for BVDV and IBR. Two control calves and 3 cases were positive for BCV (P > 0.50). A total of 46 or 31% of the viral swab samples were positive for BRSV, and 65% of those were obtained from cases (P < 0.02).

Conclusions

Cases of respiratory disease in young Holstein calves which were identified by a respiratory scoring system had significant associations with some but not all BRD viral and bacterial pathogens. Negative results for BVDV PCR on all 148 samples indicated that maximum BVDV pathogen prevalence would be less than 2% among 10,000 calves in hutches on this calf ranch.