Performance of multiple diagnostic tools in assessing the progression of respiratory disease in calves infected with IBR followed by *Mannheimia haemolytica*

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Abstract

This study objective was to evaluate the performance and applicability of multiple diagnostic tools measuring physiological, clinical, and pathological changes as indicators of early bovine respiratory disease (BRD) in calves experimentally inoculated with infectious bovine rhinotracheitis virus (IBR) and *Mannheimia haemolytica* (Mh).

Key words: IBR, mannheimia, diagnostics

Résumé

L'objectif de cette étude était d'évaluer la performance et l'applicabilité de plusieurs outils diagnostiques mesurant des changements physiologiques, cliniques et pathologiques en tant qu'indicateurs du syndrome respiratoire bovin précoce chez des veaux inoculés expérimentalement avec le virus infectieux de la rhinotrachéite bovine (VRB) et *Mannheimia haemolytica* (Mh).

Materials and Methods

Holstein steers (N=30), negative for IBR and Mh antibodies, were randomized to necropsy days and held in 1 feedlot pen. Steers were inoculated intranasally on Day 0 with IBR and intrabronchially on day 6 with Mh. Rectal temperature, computer-aided lung auscultation (CALA),[a] pulse oximetry, bilateral thoracic ultrasonography, clinical illness scores, body weight, and gross pathology (including percent lung consolidation) were evaluated in this study. Animals were euthanized on study days 6, 7, 9, 10, 11, and 13.

The calf was considered the experimental unit. Data were analyzed with generalized linear mixed models comparing changes from baseline (pre-challenge) data to repeated measures of data collected following challenge. An alpha of 0.05 was utilized in this study.

Results

The challenge model effectively reproduced naturally occurring BRD and was consistent with reported IBR and Mh disease processes. All diagnostic tests displayed significant differences across study days ($P<0.05$) compared to baseline. Clinical illness scores, body temperature, CALA, lung ultrasound, and pulse-oximetry outcomes were associated with lung consolidation at necropsy.

Conclusions

All of the diagnostic tools were able to detect statistically significant changes over time as disease progressed throughout the study. Additionally, many tools were associated with the degree of lung consolidation at the time of necropsy. The application of these diagnostic methods, either individually or in some combinations, may be of value for improving BRD diagnostic accuracy in cattle.

Endnote

[a] Whisper® Veterinary Stethoscope, Merck Animal Health, DeSoto, KS