Behavior variables of feedlot cattle clinically diagnosed with bovine respiratory disease versus case control

J. T. Richeson, *PhD* ; **P. J. Pinedo**, *DVM, PhD* ; **J. L. Pillen**, *BS* ; **S. E. Ives**, *DVM, PhD* ; **T. L. Covey**, *PhD* ; **H. K. Naikare**, *BVSc, PhD* ;
[1]*Department of Agricultural Sciences, West Texas A&M University, Canyon, TX 79016*
[2]*Texas A&M AgriLife Research, Amarillo, TX 79106; Department of Veterinary Pathobiology, College of Veterinary Medicine & Biomedical Sciences, Texas A&M University System, College Station, TX 77843*
[3]*OT Feedyard & Research Center, Hereford, TX 79045*
[4]*Texas A&M Veterinary Medical Diagnostic Laboratory, Amarillo, TX 79106*

Introduction:

Current bovine respiratory disease (BRD) diagnostic methods in the commercial feedlot setting are limited to subjective visual assessment of clinical signs and sensitivity and specificity of this method is poor. Continuous monitoring of step count, lying bouts, and duration of standing time via accelerometer device will provide insight into the behavior of clinically ill cattle and characterize the pattern of behavior change before clinical BRD diagnosis. Our primary objective was to elucidate behavior variable responses in relation to the timing of clinical disease observations by animal health technicians in a commercial feedlot and compare behavior of cattle clinically diagnosed with BRD to case control cohorts. A secondary objective was to determine BRD morbidity rate for cattle according to arrival castration status and initial body weight quartile.

Materials and Methods:

Four hundred male beef cattle procured from auction markets in south Texas were received in 4 different arrival blocks at a commercial feedlot near Hereford, TX. During initial processing, cattle were fitted with an accelerometer device proximate to the metatarsus of the right rear leg. Accelerometers recorded duration of standing time (min), number of steps traversed, number of lying bouts, and a proprietary motion index and the sum of each variable was reported in 15 min increments. Pooled means for each activity variable were generated by d. Data were analyzed to determine the mean ± standard error for the time period of d -5 to -3 and the mean ± standard error on d -1 relative to clinical BRD diagnosis. Because clinically ill cattle were removed from the pen and treated according to a standardized antimicrobial regimen, the normal pen-based behavior variables were likely confounded and thus, data from the day of treatment was not used. Furthermore, the effect of arrival castration status (bull or steer), arrival body weight quartile and arrival block on BRD morbidity rate were determined using chi-square analysis.

Results:

Among the current study population, the overall incidence of primary, secondary and tertiary clinical BRD diagnoses was 51.5, 15.2, and 4.5%, respectively. The BRD-associated mortality rate was 5.9% overall. There was a tendency (P = 0.10) for an increase in BRD morbidity observed for cattle arriving as bulls (53.9%) vs. steer cohorts (44.9%). The BRD morbidity rate for cattle categorized in lower (<25%), intermediate, and upper (>75%) initial body weight quartiles was different (P = 0.06) and averaged 50.7, 44.8, and 38.7%, respectively. Duration of standing on the d previous to BRD treatment (d -1) was 560 ± 1.94 min for cases compared to 601 ± 0.32 min for controls. The difference in average standing time between the period d -3 to -5 and d -1 relative to BRD diagnosis was -28.5 ± 1.5 and 4.95 ± 0.57 in cases and controls, respectively. Likewise, steps on d -1 relative to clinical BRD diagnosis were less for clinically ill cattle (843 ± 7.8 steps) vs. control (1,186 ± 2.2 steps). The change in average step count between the period d -5 to -3 and d -1 relative to clinical BRD diagnosis was -123.1 ± 4.2 and 50.1 ± 2.3 in cases and controls, respectively. Lying bouts were also reduced for clinically ill cattle (11.4) vs. control (14.5) on d -1. The difference in average lying bouts between the period d -3 to -5 and d -1 relative to BRD diagnosis was -0.58 ± 0.04 and 0.71 ± 0.03 in cases and controls, respectively.

Significance:

Our data suggest that cattle arriving as bulls and those with a lighter initial body weight are diagnosed with clinical BRD more often. The behavior of cattle with clinical BRD was altered; standing duration, steps taken and lying bouts were less compared to cohorts never diagnosed with clinical BRD. These data may assist practitioners to better understand the behavior of clinically ill cattle and provide a framework for determining the efficacy of cattle behavior variables as an early BRD detection method.