Economic Effects: Feeding Cattle Previously Treated for Bovine Respiratory Disease

DL Step, *DVM, DACVIM;* **Clint Krehbiel,** *PhD*
Boren Veterinary Teaching Hospital and Department of Animal Science, Oklahoma State University, Stillwater, OK 74078

Abstract

Bovine respiratory disease (BRD) is considered the most significant disease affecting beef cattle production from weaning to harvest. Identification of a predictor for BRD would assist in health and production management decisions. To allow for evidence-based recommendations to improve health and maximize production and economic returns, the value of diagnostic tests and response to various treatment protocols need to be evaluated. In this study, cattle of unknown health histories and various origins were assigned to risk categories on arrival and morbidity, mortality, performance, and economic returns were measured. Very few differences were found when comparing outcomes using initial risk category comparisons. However, comparisons of cattle grouped by different number of treatments for clinical BRD, showed significant differences.

Résumé

Le complexe respiratoire bovin (CRB) est considéré comme un problème de santé majeur des bovins de boucherie du sevrage jusqu'à l'abattage. L'identification d'un facteurrédictif de cette condition pourrait aider dans les décisions de régie au niveau de la santé et de la production. Afin d'implémenter des recommandations basées sur la médecine factuelle pour améliorer la santé et maximiser la production et les retombées économiques, la valeur des tests diagnostiques et les réponses aux différents protocoles de traitement doivent être évaluées. Dans cette étude, des bovins dont l'historique de santé et l'origine n'étaient pas connus ont été alloués à des catégories de risque à leur arrivée. Par la suite, la morbidité, la mortalité, la performance et les retombées économiques ont été mesurés. Peu de différences ont été notées suite aux comparaisons basées sur les catégories de risque initiales. Toutefois, la comparaison des bovins regroupés en fonction du nombre de traitements pour les maladies respiratoires bovines cliniques a mis en évidence des différences significatives.

Introduction

As beef cattle progress through the various phases of production from cow/calf to preconditioning, stocker, and/or finishing operations, commingling of cattle with unknown health histories from various sources is common.[8] Grouping cattle from multiple sources increases the potential risk of developing respiratory disease due to exposure to pathogens and various stressors.[3,4] Veterinarians, nutritionists, and producers consider bovine respiratory disease (BRD) the most significant disease affecting beef cattle from weaning to harvest. Loads or groups of cattle are often assigned to risk categories based on potential of developing BRD, and are thus managed accordingly. Typically, these risk categories are assigned based on perceived risk instead of measured predictors.

Various predictors of BRD have been investigated and evaluated. Acute phase proteins (APP) are produced by the liver in response to inflammatory processes. Several researchers have measured various APP and have investigated their relationship to clinical respiratory disease.[2,8,9]

Measurement of the economic impact of BRD in the various phases of production and with various risk categories of cattle can be challenging.[1,5,6,7] Producers frequently evaluate potential economic return when determining the best options for marketing cattle.

The objectives of this experiment were to:

1. allot high-risk calves to preconditioning pens according to arrival serum APP concentration (phase 1);
2. allot calves to finishing according to BRD morbidity observed during preconditioning (phase 2);
3. harvest according to similar compositional endpoint;
4. measure feedlot performance and carcass characteristics.

Materials and Methods

A total of 337 mixed-breed beef heifers were assembled at an order buyer facility from multiple sources and considered to be high-risk, exposed. At initial processing, heifers were assigned to preconditioning (backgrounding) pens based on their arrival protein concentrations (low, medium, high). Heifers were weighed on days 0, 7, 14, 21, 42, and 63 of the preconditioning phase of production.

All cattle were evaluated daily for clinical signs consistent with BRD based on DART™ and were assigned a severity score of 1 to 4. Treatment protocol for clinical BRD included three antimicrobials with the first treatment tilmicosin, the second treatment enrofloxacin, and third treatment ceftiofur. In this study, "chronic" cases of BRD were defined by the following criteria: had been administered all three antimicrobial drugs for clinical BRD according to treatment protocol, had been on feed at least 21 days, had been assigned a severity score of 3 (severe) or greater (moribund) during the 21 days following the third antimicrobial drug, and had lost body weight during the preceding 21 days on feed (DOF).

Heifers were fed ad libitum a 65% concentrate receiving/growing ration twice daily during the preconditioning phase.

After the preconditioning phase (63 days), heifers were assigned to finishing pens based on the number of BRD treatments (0, 1, 2, 3 treatments or chronic). Due to pen space availability, 193 heifers were allocated to the finishing phase of this study. Harvest dates were based on live-weight estimates and estimated carcass backfat of 0.4 inches (1.0 cm) using ultrasound evaluation. Heifers assigned as chronic based on the above case definition were harvested on the final date with the other heifers.

Performance measures included average daily gain (ADG), feed-to-gain conversion (F:G), feed cost, body weight at 63 days, and number of BRD treatments for both the preconditioning and finishing phases, as well as the combined phases of production. Carcass measures included hot carcass weight (HCW), marbling score, and yield grade (YG) for both the preconditioning, finishing phases, and the combined phases of production.

Net returns were calculated for preconditioning , finishing, and combined phases of production. Prices were estimated using USDA Agricultural Marketing Services (AMS) price reports for specific weeks when heifers were marketed.

Results and Discussion

A total of 113 (33.53%) heifers were never identified clinically with BRD; 98 (29.08%) were treated once (1 Tx); 42 (12.46%) were treated twice (2 Tx); 43 (12.76%) were treated three times (3 Tx); and 12 (3.56%) were classified as chronic. Twenty-nine (8.61%) heifers died during the preconditioning phase.

Of the 193 heifers assigned to pens for the finishing phase, 54 (27.98%) were administered 0 treatments, 54 (27.98%) had 1 treatment, 34 (17.62%) had 2 treatments, 39 (20.21%) had 3 treatments, and 12 (6.22%) were classified as chronics during the preconditioning phase. One heifer from the 2 Tx group and one heifer from the chronic group were treated for clinical BRD during the finishing phase. The chronic heifer died due to severe respiratory disease. Three other heifers, one each from the 0 Tx, 3 Tx, and chronic groups, died during the finishing phase due to digestive causes.

Low and high-risk groups experienced higher cost per pound of gain than the medium-risk group in the preconditioning phase. No significant differences in net returns were observed in the preconditioning phase between the different risk categories.

Average daily gains had the most significant effect on net return in the preconditioning phase. Average daily gains and body weight at the end of the preconditioning phase were significantly less in heifers that were treated three times (3 Tx, chronics) than heifers that were administered two or fewer treatments. As the number of BRD treatments increased, net returns in the preconditioning phase decreased.

Since heifers were fed to an estimated finished endpoint, ADG did not vary between number of BRD treatment heifers in the finishing phase. In the finishing phase, differences in net returns between number of BRD treatments were not significant. Additionally, no differences in net returns were identified between chronic and 3 Tx heifers.

Net returns for the preconditioning and combined phase were significantly different between number of BRD treatment heifers, but no differences were identified during the finishing phase.

Conclusions

In this study, no significant differences were identified between the different risk groups for net returns for preconditioning, finishing, or the two phases combined. Net returns were different in the preconditioning phase and the combined phase between the number of BRD treatments, but not in the finishing phase of production. Compensatory responses can be significant. Understanding the influence of health and its affects on net returns can assist with marketing recommendations.

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