Prevalence, severity, and relationships of multiple gross pathologies measured in beef cattle at slaughter

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Introduction

A wide array of management tools and interventions exist within the beef industry to improve animal welfare and productivity; however, the ability to monitor and assess the outcomes of those tools is lacking. Thus, a multifaceted system to observe life-cycle health and well-being of beef cattle was designed and implemented to provide producers with real-time data on cattle health and productivity. In beef cattle production systems, deficiencies in management most commonly manifest themselves as cattle with bovine respiratory disease (BRD) or nutritional disorders such as acidosis; therefore, lung, liver, and rumen gross pathology lesions present in beef cattle at slaughter were measured and their associations with performance determined.

Materials and Methods

Investigators from Kansas State University collected individual lung, liver, and rumen gross pathology data from 19,229 beef cattle processed at commercial packing plants in Kansas and Texas. Additionally, corresponding individual pre-harvest and carcass data were obtained for a subset of 13,226 cattle that had electronic identification ear tags. Associations between gross pathology lesions and outcomes of interest were assessed by the use of systematically generated multivariable general and generalized mixed models for continuous and dichotomous outcomes, respectively.

Results

At slaughter, 67.3%, 22.6%, and 9.8% of the cattle had no, mild, and severe lung lesions associated with BRD, respectively. Compared with cattle without lung lesions, cattle with severe lung lesions had 0.15 lb (0.07 kg) per day less average daily gain (ADG) and 15.6 lb (7.1 kg) less carcass weight ($P<0.001$). A total of 68.6 % of cattle had grossly normal livers (no abscesses or other abnormalities), whereas 14.9% had severely abscessed livers, of which 14.9% and 28.3% had severe and mild BRDC lung lesions, respectively. Lesions associated with rumenitis were observed in 24.1% of cattle, of which 20.6%, 21.6%, and 9.24% had mildly, moderately, and severely abscessed livers, respectively. Cattle with severe rumenitis lesions had significantly ($P<0.001$) decreased average daily gain (0.055 lb [0.025 kg] per day) and carcass weight (4.84 lb [2.20 kg]), compared with cattle without rumenitis lesions. Although most cattle in the study population would be considered low-risk of having disease, after adjusting for cattle with multiple lesions, 22.9% had severe lung, liver, or rumen lesions.

Significance

A collective gross pathology monitoring system is externally feasible within the beef industry, and the 22.9% prevalence of severe lesions (lung, liver, or rumen) indicates that significant opportunities exist to improve beef cattle health, well-being, and productivity. Data such as these must be used to provide benchmarks and support evidence-based decisions concerning the implementation or removal of managerial practices and health interventions in beef cattle production systems.