Evaluation of Thoracic Ultrasonography as a Diagnostic and Prognostic Tool for Early Bovine Respiratory Disease of Feedlot Calves in Western Canada

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Introduction

It is generally accepted that early recognition and treatment of bovine respiratory disease (BRD) improves both prognosis and outcomes, while delayed diagnosis and treatment may result in treatment failure. Methods used to detect BRD in feedlot cattle include the assessment of animal demeanor and behavior by trained feedlot workers ("pen checkers") and evaluation of transrectal temperature. The serial use of these two methods is currently the most practical, economically feasible, and common means of detecting BRD in feedlot cattle. However, recognized limitations of these methods may result in cattle without BRD being treated unnecessarily, while animals with BRD may remain undetected or be subject to delayed detection, all of which have adverse animal well-being and economic implications.

This project investigated the use of thoracic ultrasonography (US) as a diagnostic tool for the assessment of early BRD in feedlot cattle, and evaluated associations between US findings and subsequent animal health and production outcomes.

Materials and Methods

This prospective longitudinal study in 2006/2007 targeted cattle with clinical respiratory disease (cough, nasal discharge, difficulty breathing) that were diagnosed as "sick" at feedlot arrival (ARR, 30 cases, 15 controls) or pulled from pens within 30 days on feed (PP, 86 cases, 43 controls). Thoracic US (InterSonoScan 3.56 (Direct Medical Systems)) was performed over the right thorax (3rd, 5th, and 7th intercostal spaces) at enrollment and at 2-week intervals to 6 weeks post-enrollment. A "lung lesion" was defined as the presence of abnormal lung parenchyma or lung abscess based on US. Animal health (subsequent treatment, wastage and mortality) and production (average daily gain) outcomes were evaluated using statistical models controlling for intra-pen clustering of observations.

Results

During the longitudinal study, lung lesions were identified using US at enrollment in 3/29 (10.3%) ARR cases and in 16/86 (18.6%) PP cases. While statistical analyses indicated that cattle identified with lung lesions at 4 weeks post-enrollment were much more likely to have received post-enrollment therapy for BRD ($p<0.05$), the identification of lung lesions at enrollment using US was not associated with subsequent animal health outcomes (treatment, wastage, or mortality).

Significance

This study successfully assessed the utility of thoracic US in commercial feedlot cattle in Alberta. However, thoracic US was not particularly useful as a diagnostic tool or a prognostic indicator of subsequent animal health or production outcomes at the time of initial diagnosis and treatment for BRD. Nonetheless, this technique may be more useful in targeted populations of animals with respiratory disease of longer duration, such as cattle within feedlot "chronic" pens.