

Antimicrobial resistance in bovine respiratory disease: Auction market and ranch raised calves

Trent R. Wennekamp, DVM¹; John R. Campbell, DVM, DVSc¹; Cheryl L. Waldner, DVM, PhD¹; Kathy Larson, M.Sc, P.Ag¹; Claire Windeyer, BSc, DVM, DVSc²; Anatoliy Trokhymchuk, DVM, MSc, MBA³

¹Large Animal Clinical Sciences, University of Saskatchewan, Saskatoon, Saskatchewan, S7N 5B4, Canada

²Department of Production Animal Health, University of Calgary, Calgary, Alberta, T2N 1N4, Canada

³Prairie Diagnostic Services Inc., University of Saskatchewan, Saskatoon, Saskatchewan, S7N 5B4, Canada

Introduction

Antimicrobials are important tools in modern beef production. Antimicrobial drugs are often used for metaphylaxis to prevent and treat early cases of bovine respiratory disease complex (BRD) as well as for therapeutic purposes in feedlot cattle. Antimicrobial resistance of bovine respiratory pathogens can result in treatment failures and losses associated with increased treatment costs and mortalities.

Mixing of cattle from multiple sources within auction markets has always been a significant risk factor for BRD. The stress of establishing a social dominance hierarchy along with the mixing of pathogens from a variety of farm sources can increase the risk of BRD in weaned calves. One method feedlots have used to mitigate this risk is to reduce mixing stress by purchasing calves directly from the ranch rather than through the auction market.

The objective of this study was to describe the prevalence and antimicrobial sensitivity of 3 major bovine respiratory disease (BRD) bacterial pathogens at arrival and again later in the feeding period in feedlot calves derived from the auction market and from a single ranch source.

Materials and Methods

The field location for this project was a commercial feedlot in Lloydminster, Alberta. This feedlot typically buys auction market calves each fall as well as feeding calves from their own commercial cow-calf herd. 600 calves were randomly selected at entry to the feedlot to be included in the study. 300 auction market-derived, recently weaned beef calves (high risk group) along with 300 ranch calves which were raised by the feedlot and brought in at the same time as the auction market calves.

Each calf was swabbed with a double-guarded deep nasal swab at the time of entry to the feedlot. These swabs were placed in Ames medium and transported to Prairie Diagnostic Services (PDS) within 24 hours of sampling. All calves also received a long acting antimicrobial on arrival (tulathromycin) at the label dosage for metaphylaxis.

All calves were processed again between 64 and 164 days after arrival and a second deep nasal swab was collected at that time.

Isolation rates and sensitivity were compared between auction and ranch calves using Fisher Exact tests in Stata 15 (Stata Corp, College Station, TX).

Results

In the auction market calves, isolation rates of *M. haemolytica* decreased significantly from the first to the second sample. Isolation rates of *H. somni* increased significantly in these calves. As well there was a significant increase in isolates of *M. haemolytica*, *P. multocida* and *H. somni* that were not sensitive to oxytetracycline, tilmicosin and tulathromycin from the first to the second sample, and a significant increase in *P. multocida* isolates not sensitive to florfenicol. In the ranch raised calves isolation rates of *M. haemolytica*, *P. multocida* and *H. somni* all decreased significantly from the first to the second sample. In these calves there was a significant increase in *P. multocida* and *H. somni* samples not sensitive to oxytetracycline, tilmicosin and tulathromycin, and *P. multocida* samples not sensitive to florfenicol. However there was a significant decrease in *M. haemolytica* isolates that were not sensitive to oxytetracycline, tilmicosin and tulathromycin. There were few or no isolates not sensitive to ceftiofur or enrofloxacin.

Significance

Significant amounts of antimicrobial resistance can develop in both auction market and ranch raised calves over the feeding period. Antimicrobial resistance of BRD pathogens and prevalence rates of bacterial pathogens can vary in both auction market and ranch sourced calves.