

Research Summaries

Lung Pathology and Infectious Agents in Fatal Feedlot Pneumonias and Relationship with Animal and Treatment Information

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Introduction

Bovine respiratory diseases (BRD) occurring in the feedlot represent the major disease entity during the feeding period. Several bacteria, viruses, and *Mycoplasma spp* are reported as causative agents. Feedlot BRD may occur at various times, although the early disease appearing after arrival and processing often receives the most attention. The diagnostician and clinician are faced with several clinical presentations and agents/ lesions in the fatal cases.

The purpose of this study was to chart the fatal pneumonia cases over a one-year period in one Oklahoma feedyard, recording agent identification, observed pathology and animal treatment information. These cattle died either in the sick pen or suddenly in regular feeding pens without treatment. A clinical diagnosis of BRD was assigned to all cases charted. Samples of lung collected at necropsy (fresh and formalin fixed) were submitted for agent identification and histopathology. In the later stages of the study, skin samples were tested for BVDV by immunohistochemistry (IHC).

Materials and Methods

There were 237 sets of lung samples submitted from May 2002-May 2003. There were 94 skin samples for BVDV IHC from these 237 animals that died with BRD. The BRD morbidity over this interval was 14.7%. The mortality rate was 0.7% for BRD out of 1.3% total for all causes. The feedyard provided information on the individual animals including: fatal disease onset (FDO) day first treated; treatment interval (TI), interval from first treatment day until day of death; treatment

numbers (no. of treatments); number of treatments with different antibiotics and day of death.

Results

The agents isolated by bacterial culture and *Mycoplasma* culture were: *M. haemolytica* (25.0%), *P. multocida* (24.5%), *H.somni* (10.0%), *A. pyogenes* (35.0%), *Salmonella spp* (0.5%), and *Mycoplasma spp* (71.4%). Viruses recovered by cell culture were: BVDV1a NCP (2.7%); BVDV1aCP vaccine strain (1.8%); BVDV1b NCP (2.7%); BVDV2a NCP (3.2%); BVDV2b CP (0.5%); and BHV-1 (2.3%). Using a gel based PCR assay for BRSV and bovine coronavirus (BCV) there were 10.8% BCV positive and 4.6% BRSV positive. There were 5.3% positive by BVDV IHC. Means for treatment and animal data were : FDO, 32.65 days (D); TI, 29.15 D; no. treatments, 2.65; no. antibiotics, 1.89; and day of death, 61.81 D. Summary of lesions: (1) duration, acute (21%); subacute (15%); chronic (40.2%) healing (2.8%); normal (18.1%); (2) pneumonia, fibrinous pneumonia (27.1%); fibrinous pleuropneumonia 49.1%; interstitial pneumonia (5.1%); fibrinous interstitial pneumonia (1.4%); septic positive (0.9%); embolic foci (0.5%); and other (2.8%); and (3) bronchiolar lesions, bronchiolar obliterans (39.7%), bronchiolar necrosis (26.6%), bronchiolar obliterans/necrosis (1.4%), and other bronchiolar lesions (6.5%). There were statistical significant relationships among the agents, lesions, and the animal/treatment data.

Significance

There were several agents isolated from fatal feedlot pneumonias. Based on FDO, treatment interval,

and day of death, the clinical illnesses observed in this study were lengthier than those reported 16-18 years ago. Potentially the treatments currently in use impact the length of illness. There were differences in lesions that correlated with differences observed in animal and

treatments. In addition isolation of different BVDV subtypes correlated with differences in lesions and agent identification. This study illustrates the usefulness of BVDV IHC in the identification of PI animals in feedlots and detection and control of lung pathogens.

Comparison of Three Oral Chlortetracycline Treatment Regimens for Persistent *Anaplasma marginale* Carrier Clearance

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Introduction

Anaplasma marginale causes the most prevalent tick-transmitted disease of cattle. Once infected, a life-long carrier state persists to function as a disease reservoir enabling subsequent vector infection or production equipment contamination. Despite reports of successful carrier clearance, no antimicrobial compound is labeled for disease elimination. In the absence of an efficacious vaccine, a validated antimicrobial regimen for persistent *A. marginale* elimination is urgently needed. Three oral chlortetracycline (CTC) treatments were evaluated for carrier clearance in cattle persistently infected with a Virginia isolate of *A. marginale*.

Materials and Methods

Eighteen, 10-month-old Holstein steers were blocked by body weight and randomly assigned to a 2.0 mg/lb (4.4 mg/kg), 5 mg/lb (11 mg/kg) and 10 mg/lb (22 mg/kg) oral CTC treatment group (n=6). CTC was prepared in a ground corn carrier, and dosages were divided into twice daily feedings as a top dress on a grower ration. CTC plasma pharmacokinetic parameters were

assessed by high performance liquid chromatography during the treatment period. Carrier clearance was determined by a novel RT-PCR assay, the currently available cELISA, and examination of stained blood smears. Carrier clearance was confirmed by subinoculation of splenectomized calves.

Results

The 2.0 mg/lb (4.4 mg/kg), 5 mg/lb (11 mg/kg) and 10 mg/lb (22 mg/kg) treatments successfully chemosterilized all persistently infected steers 35 days after treatment initiation. No apparent difference for time of carrier clearance was detected between the 2.0 mg/lb, 5 mg/lb or 10 mg/lb treatment groups. Furthermore, the RT-PCR assay accurately identified carrier clearance three months prior to the cELISA.

Significance

Future studies are needed to evaluate the susceptibility of other *A. marginale* isolates to these treatments.