
Technical Bulletin



Comparisons of Metaphylactic Treatments of Zactran[®] (gamithromycin) vs. Excede[®] (ceftiofur crystalline free acid) in High-Risk Stocker Calves

Douglas Ensley, DVM, MS

Objective

- Compare the health and performance parameters between newly received stocker calves treated metaphylactically with Zactran[®] (6 mg gamithromycin/kg subcutaneously) to calves treated with Excede[®] (6.6 mg ceftiofur/kg subcutaneously)

Results

- Total weight gain, average weight gain and average daily gain were higher for calves treated with ZACTRAN compared to calves treated with EXCEDE
- The probability of having first-pulls for BRD was significantly lower for those calves treated with ZACTRAN compared to calves treated with EXCEDE

Conclusion

- Stocker cattle treated with ZACTRAN on arrival gained more weight, and the probability of first pull for BRD therapy was lower, compared to those calves treated with EXCEDE

Introduction

Bovine respiratory disease (BRD) is the most common reason for morbidity and mortality in backgrounding and feedlot cattle, and is a significant reason for reduced performance. It is estimated that BRD costs the U.S. feedlot industry up to \$4.28 billion dollars annually.^{1,2} The 2011 National Animal Health Monitoring System (NAHMS) study reported that 16.2 percent of feedlot placements developed BRD.³

In the feedlot and backgrounding industries, prevention, control and treatment of BRD include vaccination and the use of antimicrobials. The diagnosis of BRD based on clinical signs of illness can be inaccurate and labor intensive. An entire pen or truckload of calves determined to be at a high risk of developing BRD are commonly treated with an antimicrobial.^{4,5,6,7}

Gamithromycin is an azilide 15-member semi-synthetic macrolide antibiotic that has been developed for treatment and prevention of BRD.^{8,9} Pharmacokinetic and pharmacodynamic studies of gamithromycin showed that a single 6 mg/kg subcutaneous dose provides rapid therapeutic and persistent activity in control and prevention of infections of *Mannheimia haemolytica*, *Pasteurella multocida*, *Histophilus somni* and *Mycoplasma bovis*.

Ceftiofur crystalline-free acid sterile suspension is approved for the treatment and control of BRD when a single 6.6 mg/kg dose is administered in the base of the ear.¹⁰

Materials and Methods

This multi-site study was conducted in Copan, Oklahoma, and multiple locations near Monticello, Missouri. Cattle in all sites were beef or beef-cross bulls, steers and heifers approximately 4 to 11 months old of sale barn origin. There were 12 replicate pen pairs across all sites. Calves were treated on Day 0 of the study; however, day 0 was not the same calendar day for all animals, but was the same day for all animals in a replicate. All cattle were randomized to one of two treatments:

Treatment 1: ZACTRAN at 6 mg gamithromycin/kg subcutaneously

Treatment 2: EXCEDE at 6.6 mg ceftiofur/kg subcutaneously

Water and grass or alfalfa hay were provided ad libitum during the first day following arrival. Subsequently, calves were provided with a starter ration, free-choice grass (hay if needed) and water in a manner consistent with industry practice. Receiving, growing and finishing rations were fed according to standard practice of each site. Feed provided to treatment pens was weighed daily and recorded by pen.

Animals displaying signs of BRD within six days after treatment were pulled and taken to the hospital for further evaluation. Rectal temperatures and clinical-illness scores (CIS) were recorded for all animals pulled from their treatment pens. Up to three sequential administrations of BRD therapy with approved antimicrobials were given to animals with a CIS > 1 and a rectal temperature >104.0°F (40°C) during the study period after Day 0.

Animals not responding after the third BRD treatment were classified as chronics and removed from the study.

Individual weights were recorded at the beginning of the study (Day 0) and at the end of the study (Days 44–49). All animals that died were necropsied and classified as either BRD or non-BRD mortalities. Chronics (i.e., cattle that received all three BRD therapies) and removals were classified as either BRD or non-BRD.

Results

With data for all pen replicates at all sites combined, **total weight gain, mean weight gain and average daily gain were significantly greater** ($p \leq 0.05$) for cattle treated with ZACTRAN than for those treated with EXCEDE (Figure 1). Feed conversion was better for cattle treated with ZACTRAN than for cattle treated with EXCEDE (11.18 vs. 15.94); however, the difference was not significant ($p \leq 0.14$)⁸ (Figure 2).

Figure 1.

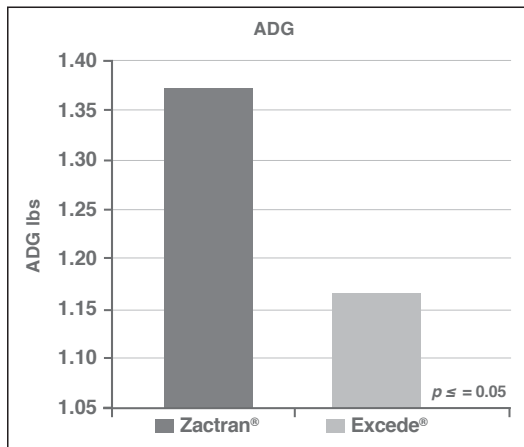
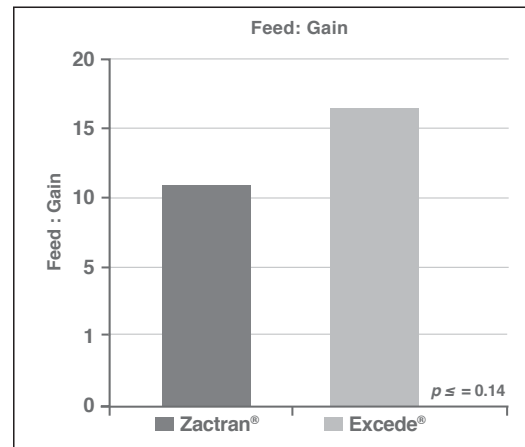


Figure 2.



Calves treated with ZACTRAN had a significantly lower probability of being pulled for BRD therapy than calves treated with EXCEDE (Figure 3). The probability of a relapse was lower for calves treated with ZACTRAN than for those treated with EXCEDE, but the difference was not significant (Figure 4).

Figure 3.

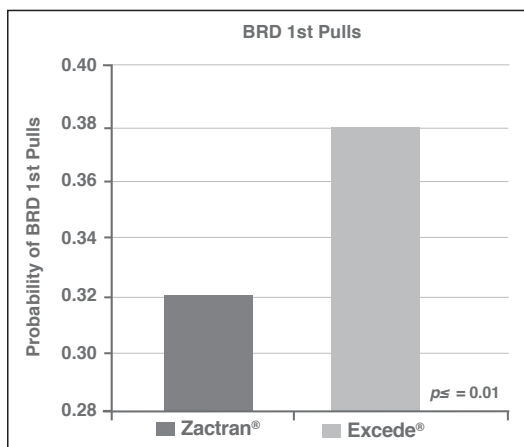
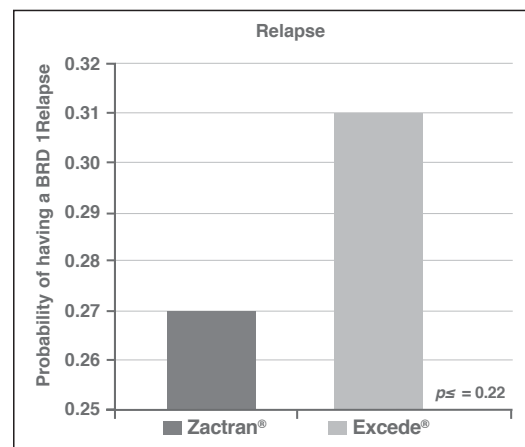


Figure 4.



Conclusion

Results of this multi-site study indicate that a single dose of ZACTRAN containing gamithromycin dosed at 6 mg/kg is effective as a metaphylactic treatment for BRD in newly received stocker cattle. In this study, stocker cattle treated metaphylactically with ZACTRAN for BRD **gained significantly more weight and required significantly fewer first pulls for BRD therapy** compared to cattle treated with EXCEDE. In addition, cattle treated with ZACTRAN generally demonstrated improved feed conversion compared to cattle treated with EXCEDE.

ZACTRAN IMPORTANT SAFETY INFORMATION: Do not treat cattle within 35 days of slaughter. Do not use in female dairy cattle 20 months of age or older, or in calves to be processed for veal. Subcutaneous injection may cause a transient local tissue reaction in some cattle that may result in trim loss of edible tissues at slaughter. NOT FOR USE IN HUMANS.

References

- ¹ Smith RA. Impact of disease on feedlot performance: a review. *J. Anim Sci* 1998;76(1):272–274.
- ² Griffin D. Economic impact associated with respiratory disease in beef cattle. *Vet Clin North Am Food Anim Pract* 1997;13(3):367–377.
- ³ USDA APHIS, Veterinary Services – Centers for Epidemiology and Animal Health. Types and costs of respiratory disease treatments in the U.S. feedlots. 2013.
Available at: https://books.google.com/books/about/Types_and_Costs_of_Respiratory_Disease_T.html?id=0aSznGEACAAJ.
Accessed March 11, 2019.
- ⁴ Cusack PM, McMeniman N, Lean IJ. The medicine and epidemiology of bovine respiratory disease in feedlots. *Aust Vet J* 2003;81(8):480–487.
- ⁵ Taylor JD, Fulton RW, Lehenbauer TW, et al. The epidemiology of bovine respiratory disease: What is the evidence for preventive measures? *Can Vet J* 2010;51(12):1351–1359.
- ⁶ White BJ, Renter DG. Bayesian estimation of the performance of using clinical observations and harvest lung lesions for diagnosing bovine respiratory disease in post-weaned beef calves. *J. Vet Diagn Invest* 2009;21(4):446–453.
- ⁷ Nickell JS, White BJ: Metaphylactic antimicrobial therapy for bovine respiratory disease in stocker and feedlot cattle. *Vet Clin North Am Food Anim Pract* 2010;26(2):285–301.
- ⁸ Forbes AB, Ramage C, Sales J, et al. Determination of the duration of antibacterial efficacy following administration of gamithromycin using a bovine *Mannheimia haemolytica* challenge model. *Antimicrob Agents Chemother* 2011;55(2):831–835.
- ⁹ Huang RA, Letendre LT, Banav N, et al. Pharmacokinetics of gamithromycin in cattle with comparison of plasma and lung tissue concentrations and plasma antibacterial activity. *J Vet Pharmacol Ther* 2010;33(3):227–237.
- ¹⁰ Hibbard B, Robb EJ, Chester ST Jr., et al. Dose determination and confirmation for ceftiofur crystalline-free acid administered in the posterior aspect of the ear for control and treatment of bovine respiratory disease. *Vet Ther* 2002;3(1):22–30.

*This Technical Bulletin is a brief summary from Amrine D, White B, Goehl D, et al. Comparisons of metaphylactic treatments of Zactran® (gamithromycin) vs. Excede® (ceftiofur crystalline-free acid) in high-risk stocker calves. *Intern J Appl Res Vet Med* 2014;12(3):221–228.