Efficacy of Difloxacin in a *Pasteurella haemolytica* Calf Challenge Model

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This study evaluated the efficacy of an injectable formulation of a novel fluroquinolone using a *Pasteurella haemolytica* challenge model. Calves entered the study at either 24 or 48 hours after bacterial challenge and were treated for 5 days with 2.5 or 5 mg/kg of either a 5% or a 10% difloxacin preparation, a comparative treatment (5 mg/kg of enrofloxacin), or a control treatment consisting of saline (0.1 ml/kg). Twelve calves were randomly assigned to each of the six groups. All drugs were administered subcutaneously in the neck. The calves were examined and scored daily (temperature, respiratory rate, attitude, appetite) until the conclusion of the study (Day 15 after challenge) at which time the gross lung appearance was evaluated and scored (percent pneumonia). All examinations were conducted blindly. Clinical parameters and several rates (mortality, cure, relapse) were compared using a significance level of 0.05. A cure was defined as a return to normal temperature, respiration, attitude, and appetite by Day 6 of the study. A relapse was defined as those calves which were considered a cure by Day 6 and subsequently developed two consecutive days any one of the following: abnormal temperature, abnormal respiratory rate, moderate depression, or moderate decrease in appetite.

The mortality rate in all the treated calves was zero (100% survival). The mortality rate in the saline control calves was 5/12. The cure rates were 3/12 for the saline control group, 12/12 for the 2.5 mg/kg difloxacin 5% group, 8/12 for the 2.5 mg/kg difloxacin 10% group, 10/12 for the 5 mg/kg difloxacin 5% group, 11/12 for the 5 mg/kg difloxacin 10% group, and 10/12 for the 5 mg/kg enrofloxacin group. The relapse rates were 1/3 for the saline control group, 3/12 for the 2.5 mg/kg difloxacin 5% group, 4.8 for the 2.5 mg/kg difloxacin 10% group, 3/10 for the 5 mg/kg difloxacin 5% group, 2/11 for the 5 mg/kg difloxacin 10% group, and 5/10 for the 5 mg/kg enrofloxacin group. Control calves lost a mean of 0.12 kg/hd/d (0.26 lb/hd/d) which was significantly different from the treatment groups which gained from 0.68 to 0.90 kg/hd/d (1.5 to 2.0 lb/hd/d). The Day 1 to Day 3 temperature reduction was 0.2°F for the saline control group, significantly less than the reductions (2.3 to 2.6°F) in the treatment groups. Respiratory, appetite, and attitude scores were significantly worse for the saline control group than the treatment groups for almost the entire study period. A weighted composite score, overall sickness score, was also used to compare the clinical parameters among groups. The saline control group had a consistently worse score than all the treatment groups. The percentage of gross damaged lung tissue was significantly greater for the saline control group (34.7%) compared to the treatment groups. The treatment groups had a similar amount of lung damage (13.3 to 17.5%). *Pasteurella haemolytica* was cultured from at least 2 calves in each group.

In this severe challenge model, the novel fluroquinolone difloxacin had a significant beneficial impact upon calf health.