

Efficacy of ponazuril in weaned feeder lambs with naturally acquired coccidiosis

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Introduction

Coccidiosis is a common and economically significant parasitic disease that causes diarrhea, weight loss, and death in lambs. Coccidiostats currently labeled in the US for ovine coccidiosis are challenging to administer at effective doses in sick lambs and clinically ineffectual when used late in the disease process. Newer triazinone-class coccidiocidal drugs, such as toltrazuril (Baycox®, Bayer Animal Health) are effective across a greater range of *Eimeria*'s life cycle, resulting in improved clinical response and treatment compliance. Ponazuril (toltrazuril sulfone), an active metabolite of toltrazuril, is labeled in the United States for treatment of equine protozoal myeloencephalitis and is being used extra-label in sheep and goats for treatment of coccidiosis despite a lack of published data regarding its clinical effectiveness in sheep. The objective of this study is to determine the efficacy (fecal oocyst shedding, fecal consistency, and lamb growth performance) of a single low (2.27 mg/lb; 5 mg/kg) or high (9.1 mg/lb; 20 mg/kg) oral dose of ponazuril for treatment of naturally-acquired coccidiosis (*Eimeria* spp) in commercial feeder lambs.

Materials and Methods

In this study, 33 weaned commercial feeder lambs with naturally acquired coccidiosis were blocked by sex, weight, and initial fecal score, then randomly assigned to high dose (9.1 mg/lb; 20 mg/kg ponazuril), low dose (2.27 mg/lb; 5 mg/kg ponazuril), or an untreated control group. The high and low dose treatment groups received a single dose of ponazuril via oro-esophageal tube on day 0; individual quantitative fecal oocyst counts (modified McMaster's protocol), fecal scores, and lamb live weights (kg) were recorded for a 3 week period. Identification of *Eimeria* species based on

morphological characteristics was performed on a single representative sample. Statistical analysis utilized a repeated measures mixed procedure model (fixed effects included subject, sex, weight, and treatment group) for assessment of fecal oocyst counts, a 1-tailed sign test for median fecal score, and a 1-tailed t-test for overall average daily gain (ADG).

Results

The results showed that the high dose (20 mg/kg) treatment group demonstrated improvements in fecal score and oocyst counts at multiple time points compared to the low dose (2.27 mg/lb; 5 mg/kg) and untreated control groups as well as a higher overall ADG compared to the low dose group ($P < 0.05$); significant differences were observed during the 2-week period following treatment. Sex and weight were also identified as significant fixed effect covariates in the fecal oocyst count model. Fecal oocyst counts ranged from 0 to 326,000 oocysts per gram of feces, primarily comprised of low to moderate pathogenicity coccidia (*Eimeria bakuensis* (ovina) (44%), *E. parva* (20%), *E. ovinodalis* (16%), *E. granulosa* (14%), *E. faurei* (4%), and *E. punctate* (2%)).

Significance

In conclusion, a single high oral dose (9.1 mg/lb; 20 mg/kg) of ponazuril is more effective than a low dose (2.27 mg/lb; 5 mg/kg) or no treatment in reducing *Eimeria* spp fecal shedding, normalizing fecal scores, and increasing ADG in weaned lambs during an outbreak of naturally acquired coccidiosis. However, observed oocyst counts in this study were extremely high, poorly associated with fecal score, and not associated with severe morbidity. These findings may not apply to herds with a predominant challenge from *E. crandallii* or a higher prevalence of *E. ovinodalis*.