Investigation of the Bi-Weekly Administration of Diclazuril on the Antibody Kinetics to *Sarcocystis Neurona* in Healthy Horses

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The administration of diclazuril® pelleted top dress at half the label dose (0.5 mg/kg) twice weekly was able to maintain low titers to *Sarcocystis neurona* in healthy adult horses naturally exposed to the protozoal parasite. Further, trough diclazuril levels were in excess of the minimal concentration known to inhibit *S. neurona*. Authors’ addresses: Department of Medicine and Epidemiology, School of Veterinary Medicine, University of California, One Shields Avenue, Davis, CA 95616 (Pusterla); Department of Obstetrics, Gynecology and Reproductive Biology, Massachusetts General Hospital, Boston, MA 02114 (James); Merck Animal Health, 2 Giralda Farms, Madison, NJ 07940 (Bain, Barnett, Chappell, Gaughan, Craig, Schneider, Vaala); College of Veterinary Medicine, North Carolina State University, Raleigh, NC 27606 (Papich); e-mail: npusterla@ucdavis.edu. *Corresponding and presenting author. © 2021 AAEP.

1. Introduction

Prevention of equine protozoal myeloencephalitis represents an important challenge, and its focus relies on wildlife management, risk-factor manipulation, and use of antiprotozoal medication. A recent study showed that bi-weekly administration of diclazuril at half the current label dose produced steady-state plasma drug concentrations known to inhibit *S. neurona*. The aim of this study was to determine if bi-weekly administration of diclazuril at half the label dose would reduce seroprevalence and magnitude of titers to *S. neurona* in healthy horses naturally exposed to the apicomplexan protozoal parasite.

2. Materials and Methods

Twenty healthy adult horses were moved from a low-risk exposure to a farm with high exposure rate to *S. neurona* in their horse population. The
horses were randomly assigned to either a treatment or a control group. Treatment consisted in the administration of 0.5 mg/kg body weight of diclazuril pelleted top dress twice weekly (every 3–4 days) for 12 months. Prior to initiation of treatment and monthly thereafter, blood was collected for the detection of antibodies to *S. neurona* using a quantitative immunoassay. Further, trough plasma diclazuril levels were determined every 60 days. Frequency distributions of the titers at each time point were compared with Fisher's exact test between treated and control groups; repeated-measures analyses (analysis of variance and mixed-effects ordinal logistic regression) were also utilized to determine differences in raw titers between treatment and control groups over time.

3. Results and Discussion

All 20 horses remained healthy during the entire study period. At study commencement, the seroprevalence to *S. neurona*, defined as the percentage of horses in each group with a titer ≥ 40, was 70% and 80% in the control and treatment group, respectively. The initial seroprevalence decreased initially in the treatment group to 50% at 30 days post-treatment commencement, while the seroprevalence in the control group increased to 90%. This was followed by a slow increase in seroprevalence in the treatment group before reaching 100% in both groups by 90 days post-treatment commencement. The seroprevalence remained 100% in both groups from 90 to 360 study days. While titer distribution between the two groups was similar at study commencement, treated horses displayed significantly lower titers throughout the treatment period (*P* < 0.05). All treated study horses had detectable plasma trough diclazuril levels at the six time points, and the levels were above the concentration known to inhibit *S. neurona* in vitro (1 ng/mL).

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Declaration of Ethics

The Authors have adhered to the Principles of Veterinary Medical Ethics of the AVMA.

Conflicts of Interest

Drs. Fairfield Bain, Craig Barnett, Duane Chappell, Earl Gaughan, Bryant Craig, Chrissie Schneider and Wendy Vaala work for Merck Animal Health.

Footnote

* Protazil®, Merck Animal Health, Madison, NJ 07901.