Pharmacokinetics, Pharmacodynamic Efficacy, and Safety of Acetaminophen in Adult Horses with Naturally Occurring Chronic Lameness

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Acetaminophen is safe dosed at 30 mg/kg, PO, q12h for 21 days but not suitable as a monotherapy for analgesia. Authors’ addresses: Department of Biomedical Sciences and Pathobiology (Mercer, Davis, Cecere); Department of Large Animal Clinical Sciences (McKenzie, Byron, Trager-Burns, Wilson); Marion duPont Scott Equine Medical Center (Kelleher); Department of Population Health Sciences (Werre), Virginia Maryland College of Veterinary Medicine, Blacksburg, VA 24060; e-mail: mmercer1@vt.edu. *Corresponding and presenting author. © 2021 AAEP.

1. Introduction
Prolonged use of traditional NSAIDs is associated with adverse effects in horses. Acetaminophen has been combined with NSAIDs for treatment of orthopedic pain in horses. This study aimed to determine the pharmacokinetics, safety, and efficacy of acetaminophen in naturally occurring lameness.

2. Materials and Methods
Twelve horses with chronic lamenesses were administered acetaminophen (30 mg/kg, PO, q12h) for 21 days. Pharmacokinetic analysis was performed on days 7 and 21 and analyzed via liquid chromatography-tandem mass spectometry (LC-MS/MS). Clinicopathologic analysis, gastroscopy, and liver biopsy were performed on days 0 and 22. Objective lameness evaluation was performed over 12 hours without drug (control) and on day 21 of treatment.

3. Results
Maximum plasma acetaminophen concentrations were 22.70 ± 10.25 ug/mL occurring at 0.44 ± 0.22
hours on day 7 and 18.37 ± 6.91 ug/mL at 0.71 ± 0.26 hours on day 21. Squamous mucosa ulcer scores improved from day 0 (0.73 ± 0.11) to day 22 (0.28 ± 0.12; p = 0.03). There were no clinically significant differences in liver biopsy scores or clinico-pathologic parameters. There was a statistically significant improvement in the vector sum total head height compared to time 0 at 1 hour post treatment (11 ± 45%) compared to baseline control (−25 ± 60%; p = 0.003).

4. Discussion
Absorption of acetaminophen was variable and dependent on the rate of gastric emptying similar to previous reports. Acetaminophen is safe following 21 days of treatment in adult horses but may not be effective alone for management of chronic naturally occurring lameness.

Acknowledgments

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

Conflict of Interest
The Authors have no conflicts of interest.