Pharmacokinetics and Safety of an Oral Cannabidiol Product in Horses

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Cannabidiol (CBD) administered orally has dose-dependent plasma bioavailability and is detectable in synovial fluid in horses. Authors’ address: Department of Clinical Sciences, College of Veterinary Medicine and Biomedical Sciences, Colorado State University, Fort Collins, CO 80523; e-mail: erin.contino@colostate.edu. *Corresponding author; †presenting author. © 2021 AAEP.

1. Introduction

Cannabidiol (CBD) is widely marketed to reduce anxiety and pain, but limited safety, efficacy, or pharmacokinetic data is available in horses. The objectives of this study were to determine (1) plasma pharmacokinetics, (2) short-term safety, and (3) synovial fluid levels of CBD following oral administration.

2. Materials and Methods

Two groups of 6 horses were administered sunflower lecithin oil-based CBD at 1 mg/kg (group 1) or 3 mg/kg (group 2) for a 24-hour pharmacokinetic study. All horses then received 0.5 mg/kg or 1.5 mg/kg q12h PO for 6 weeks with steady state and elimination sampling performed up to 96 hours post final dose. Synovial fluid concentrations were evaluated at 12 and 24 hours and 5 weeks. Horses were monitored daily, and clinicopathologic parameters were evaluated.

3. Results

Mean ± SD Cmax and Tmax were 4.3 ± 2.1 ng/mL and 4.1 ± 4.1 hours and 19.9 ± 15.6 ng/mL and 5.0 ± 3.7 hours for groups 1 and 2, respectively. Following the final dose at 6 weeks, one group-2 horse still had detectable plasma levels at 96 hours. CBD was detectable in synovial fluid in 8 horses during steady state. Mild hypocalcemia was seen in all horses, and elevated liver enzymes were observed in 8 horses, but these changes decreased or normalized 10 days after the final CBD dose.

4. Discussion

CBD has dose-dependent, but variable, oral bioavailability at 1 mg/kg and 3 mg/kg daily dosing. CBD is detectable at steady state in synovial fluid at the higher dose. Further investigation is needed to establish clinically effective doses.
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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.