PHARMACOKINETICS OF INTRAVENOUS AND INTRAMUSCULAR TRAMADOL IN LLAMAS

Thomas Doherty¹, Sherry Cox², Tomas Martin-Jimenez², Jason Yarbrough², Sarel van Amstel²

¹Large Animal Clinical Sciences, ²The University of Tennessee, Knoxville, TN, USA

CAMELIDS are a rapidly growing aspect of small ruminant agriculture in the US. The popularity and numbers of llamas being kept as pets, packing animals, and show animals has increased in recent years. With the increasing numbers of CAMELIDS there is a greater demand for veterinary services; however, there are no drugs approved by the FDA for use in CAMELIDS, and pharmaceutical companies cannot economically justify seeking approval of drugs for this species. Tramadol is a centrally acting analgesic, with opioid agonist features, that has been used to treat moderate to severe pain in humans.

The purpose of this study was to determine the pharmacokinetics of tramadol (2 mg/kg), and its metabolite M1, after intravenous and intramuscular administration to llamas. Six, healthy, adult, male llamas were used to determine the metabolism of tramadol.

Tramadol half-life, volume of distribution at steady state, clearance and AUC after intravenous administration were 4.43 ± 0.90 h, 4902.68 ± 1495.91 mL/kg and 1680.50 ± 141.05 mL/h/kg, 1193.65 ± 99.19 h·ng/mL, respectively. The bioavailability was 110 ± 21% and half-life 3.00 ± 0.15 h with intramuscular administration. M1 had a half-life of 10.40 ± 2.9 h and 7.71 ± 0.54 h following intravenous and intramuscular administration of tramadol, respectively. No adverse effects were observed.

Administration of tramadol resulted in plasma concentrations great enough to produce analgesia, based on human data. Pharmacodynamic studies need to be completed to determine the analgesic efficacy of tramadol, at this dose, in llamas.