Efficacy of Intramuscular Meperidine Hydrochloride Versus Placebo in Experimental Foot Lameness in Horses

Jonathan H. Foreman, DVM, MS, Diplomate ACVIM*; and Rebecca Ruemmler, DVM

Meperidine may provide a suitable nonsteroidal anti-inflammatory drug alternative analgesic for acute foot pain, but it requires more frequent administration. Authors’ address: University of Illinois at Urbana-Champaign, College of Veterinary Medicine, Department of Veterinary Clinical Medicine, 1008 West Hazelwood Drive, Urbana, IL 61802. Dr Ruemmler’s current address is Boston Equine Associates, 28 Tremont Street, Rehoboth, MA 02769; e-mail: jhf@illinois.edu. *Corresponding and presenting author. © 2013 AAEP.

1. Introduction

There are no refereed, blinded, controlled documentations of the skeletal analgesic efficacy of intramuscularly administered meperidine. The objective of this study was to test the hypothesis that meperidine (pethidine) administered intramuscularly would be more efficacious in alleviating lameness than would a saline placebo in an adjustable heart bar shoe model of equine foot pain.

2. Materials and Methods

Eight healthy adult Thoroughbred horses randomly underwent weekly intramuscular treatments 1 hour after lameness induction: saline placebo (1 mL/45 kg body weight) or meperidine HCl (1 mg/kg IM). Heart rate and lameness score responses were assessed by a blinded observer every 20 minutes for 5 hours after lameness induction and then hourly through 12 hours after treatment. Jugular venous blood samples were obtained at hours −1, 0, 0:05, 1, 2, 4, 6, 8, 10, and 12 and were subsequently analyzed for drug concentrations (lower limit of detection, 1 ng/mL). Repeated-measures analysis of variance and post hoc Tukey’s test were used to identify analgesic effects at a significance level of $P < 0.05$.

3. Results

Mean (±SE) heart rates were lower in meperidine trials at 2.3, 3.3, and 3.7 hours after administration ($P < 0.05$). Mean lameness scores were lower in meperidine trials from 2.0, 2.3, and 3.3 hours after administration ($P < 0.05$). Mean plasma [meperidine] peaked at 227 ± 52 ng/mL at 1 hour after administration and decreased to 2.7 ± 0.3 ng/mL at 12 hours after administration. In three of eight subjects, plasma [meperidine] was below the lower limit of detection at 12 hours after administration.

4. Conclusions

It was concluded that intramuscular meperidine was more effective than saline placebo but only for a short period of time (2.0–3.67 hours after administration) compared with previous 8- to 12-hour durations of efficacy in this same model when horses...
were treated with nonsteroidal anti-inflammatory drugs.

Acknowledgments

This study was funded by the Maria Caleel Fund for Equine Sports Medicine Research at the University of Illinois. Horses were purchased with funds provided by the Grayson/Jockey Club Foundation, Keeneland Racing Association, and Thoroughbred Owners and Breeders Association, Kentucky Thoroughbred Association. The authors thank Drs Jason Bundy and Keith Zientek for technical assistance.