Pharmacokinetics, Pharmacodynamics, and Safety of N-Butylscopolammonium Bromide Administered Intramuscularly Versus Intravenously

Joseph J. Bertone, DVM, MS; Holly M. Greene, MS; Margaret Sislak, DVM; Heidi Agnic, DVM; Melodee Heidmiller; Scott Stanley, PhD; and Steven J. Wickler, DVM, PhD

N-Butylscopolammonium bromide can be administered safely and effectively to horses via the intramuscular (IM) route. The duration of gastrointestinal effect, when administered IM, is prolonged up to 30 min over the IV route, as U.S. Food and Drug Administration approved. Heart rate is significantly protected when administered IM versus IV. Authors’ addresses: Western University of Health Sciences, College of Veterinary Medicine, 309 East Second Street, Pomona, California 91786 (Bertone, Sislak, Agnic, Heidmiller); California State Polytechnic University, 3801 West Temple Avenue, Pomona, California 91768 (Greene, Wickler); and California Animal Health & Food Safety Laboratory System, 152 Equine Analytical Lab, Davis, California 95616 (Stanley); e-mail: jbertone@westernu.edu. © 2010 AAEP.

1. Introduction
The objectives of this study were to compare the pharmacokinetics, heart rate, gastrointestinal sounds, and safety of N-butylscopolammonium bromide (NBSB) administered IM versus IV.

2. Materials and Methods
Six adult horses received N-butylscopolammonium bromide at a dose of 0.3 mg/kg IV or IM in a random cross-over design. Three masked-to-treatment investigators auscultated for gastrointestinal sounds interpreted as those associated with cecal contraction. The three investigators trained together on two separate occasions before the study to ensure that sounds interpreted as major cecal contractions were quantitated consistently and uniformly between and within the three masked investigators. Each investigator counted major contractile sounds per minute. Heart rate (beats/min) and auscultated gastrointestinal sounds associated with cecal contraction were collected at time 0 (before drug administration), 5 min after, every 3 min up to and including 26 min, and at 30, 45, 60, 120, 180, and 240 min from time 0. Heart rate was monitored using a heart rate monitor. Physical and ultrasonographic evaluations were used to examine the IM injection sites. Blood samples were collected via a jugular catheter at 1-min intervals from 0 to 20
min and at 25, 30, 45, 60, 120, 180, and 240 min from time 0 for plasma NBSB analysis.

3. Results
Heart rates for horses administered NBSB IV were greater at all points from time 5 to 26 compared with IM. Gastrointestinal sounds reached full cessation at 5 min in the IV horses and by 11 min in the IM horses and returned to baseline 15 min later with IM versus the IV routes. All physiological measures correlated well with plasma drug concentrations. Importantly, the heart rate elevation seen in the distribution phase of IV administration was not seen with the IM route. No physical or ultrasonographic evidence of injection site irritation was seen.

4. Discussion
Although there was a difference between the IV and IM routes in terms of induction to affect and recovery of gastrointestinal sounds the findings were clinically comparable. An increased duration may be expected with use of the IM route. In terms of heart rate, the initial affect was greatly diminished in the IM versus the IV route. The IM route seems to be a safe and effective means of administration.

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Footnote
(“Buscopan, Boehringer Ingelheim GmbH, Germany.)