

## **Pharmacokinetics of bupivacaine after bilateral maxillary and inferior alveolar nerve blocks in adult cats**

B. P. Monteiro<sup>1</sup>; M. Garbin<sup>1</sup>; J. Benito<sup>1</sup>; H. L. M. Ruel<sup>1</sup>; P. Cagnardi<sup>2</sup>; P. V. Steagall<sup>1,3</sup>

1 Department of Clinical Sciences, Faculty of Veterinary Medicine, Université de Montréal, Saint-Hyacinthe, Quebec, Canada; 2 Department of Veterinary Medicine and Animal Sciences, University of Milan, Lodi (MI), Italy; 3 Department of Veterinary Clinical Sciences and Centre for Animal Health and Welfare, Jockey Club College of Veterinary Medicine and Life Sciences, City University of Hong Kong, Hong Kong, China

**Objectives:** This study described the pharmacokinetics of bupivacaine after bilateral maxillary and inferior alveolar nerve blocks in adult cats under general anesthesia.

**Materials and Methods:** Ten healthy adult cats ( $4.8 \pm 0.8$  kg) were included in a randomized, prospective trial. Anesthetic protocol included acepromazine-methadone-propofol-isoflurane. Each cat randomly received 0.2 (BUPI2) or 0.3 mL (BUPI3) per site of bupivacaine 0.5% (4 and 6 mg per cat, respectively) ( $n = 5$ /group). Blood was collected before (time 0) and at 2, 7, 20, 30, 60, 120, 240, 360, 480 and 600 min after the four nerve blocks. Plasma concentrations of bupivacaine were analyzed using liquid chromatography–tandem mass spectrometry. Bupivacaine pharmacokinetics was described using a non-compartmental analysis and parameters were compared using pairwise comparisons ( $p < .05$ ).

**Results:** Doses of bupivacaine were significantly different (BUPI2:  $0.89 \pm 0.15$  mg/kg; BUPI3:  $1.22 \pm 0.21$  mg/kg). For BUPI2 and BUPI3, maximum bupivacaine plasma concentrations ( $C_{max}$ ) were  $825 \pm 299$  and  $926 \pm 196$  ng/mL at  $5.0 \pm 2.7$  and  $9.6 \pm 5.8$  min ( $T_{max}$ ), area under the curve (AUC) to last measured concentration was  $142 \pm 36$  and  $178 \pm 60$  min\* $\mu$ g/mL, clearance was  $5.4 \pm 0.8$  and  $7.0 \pm 5.7$  mL/min/ kg, elimination half-life was  $245 \pm 54$  and  $278 \pm 90$  min, and mean residence time to the last measured concentration was  $185 \pm 13$  and  $182 \pm 33$  min, respectively (all comparisons  $p > .05$ ). Small concentrations of bupivacaine were detected at 600 min ( $72 \pm 22$  in BUPI2 and  $104 \pm 55$  ng/mL in BUPI3).

**Conclusions:** Bilateral maxillary and inferior alveolar nerve blocks using two volumes and doses of administration did not produce signs of toxicosis even when peak concentrations were achieved shortly after injection. Further studies are warranted to investigate the pharmacodynamics of dental blocks in cats.

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