

Pharmacokinetics of ropivacaine after intraperitoneal administration to dogs undergoing ovariectomy or ovariohysterectomy: preliminary results

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This study evaluated the pharmacokinetics of intraperitoneal ropivacaine in dogs.

Ten dogs undergoing spay were anaesthetised and randomised to receive either 1 (group R1; n = 5) or 3 (group R3; n = 5) mg kg⁻¹ of ropivacaine intraperitoneally, diluted with 0.9% sodium chloride to a total volume of 0.8 mL kg⁻¹. After ovariectomy/ovariohysterectomy, solution aliquots were instilled over the ovarian and uterine stumps. Jugular vein blood was sampled 2 minutes before and 5, 10, 15, 30, 45, 60, 120 and 240 minutes after instillation.

Plasma ropivacaine concentrations were measured using liquid chromatography–mass spectrometry. Plasma protein binding (PPB) was determined by rapid equilibrium dialysis at each timepoint. Pharmacokinetic parameters based on total concentrations were described by a non-compartmental analysis. Wilcoxon rank-sum or Student T tests were used, according to distribution, to compare mean variables between groups.

Mean PPB was 90.1 (± 4.09) %. For R1 and R3, maximum total ropivacaine plasma concentrations (C_{max}) were 304.0 (± 84.8) and 418.4 (± 87.2) ng mL⁻¹ at 30 (15–45) and 5 (5–60) minutes, mean elimination half-life was 106.0 (± 45.6) and 130.0 (± 26.7) minutes, mean clearance (CL) was 0.68 (± 0.31) and 1.10 (± 0.36) L min⁻¹, mean volume of distribution (Vd) was 103.70 (± 69.21) and 208.70 (± 87.28) L, area under the curve from 0 to last time point measured (AUC_{last}) were 34.41 (± 11.70), and 44.48 (± 20.35) min*ng L⁻¹, and to infinity (AUC_{infinity}) 51.85 (± 6.61) and 72.81 (± 13.59) min*ng L⁻¹. Although C_{max}, Vd and CL showed a tendency to differ, only the AUC_{last} and AUC_{infinity} were significantly different between groups (p < 0.05).

The mean exposure to ropivacaine was higher in R3 but not 3-fold indicating non-linear pharmacokinetics. The total ropivacaine plasma concentration was below previously reported toxic levels in all dogs.