

Can a sacrococcygeal epidural of 0.25% bupivacaine prevent the activation of the sympathetic nervous system during feline ovariectiony?

João Martins^{1,2,3,4}, António Eliseu⁵, Sónia Campos^{1,2}, Lénio Ribeiro¹, Pablo Otero⁶, Patrícia Cabral², Bruno Colaço^{3,4}, José Diogo dos-Santos^{1,3}

¹Research in Veterinary Medicine (I-MVET), Faculty of Veterinary Medicine, Lusófona University, Lisbon University Centre, Portugal.

²Veterinary and Animal Research Centre (CECAV), Faculty of Veterinary Medicine, Lusófona University, Lisbon University Centre, Portugal.

³Associate Laboratory for Animal and Veterinary Sciences (AL4Animals), Lisbon, Portugal.

⁴Centre for the Research and Technology of Agro-Environmental and Biological Sciences (CITAB), Universidade de Trás-os-Montes e Alto Douro (UTAD), Vila Real, Portugal.

⁵Faculty of Veterinary Medicine, Lusófona University, Lisbon University Center, Lisbon, Portugal.

⁶Department of Anesthesiology and Pain Management, Facultad de Ciencias Veterinarias, Universidad de Buenos Aires, Buenos Aires, Argentina.

Objectives: The ovariectiony (OVE) procedure can trigger somatosensory and visceral peritoneal nociception. Sacrococcygeal epidural (ScE) anesthesia may complement or replace systemic analgesia used for feline OVE, reducing opioid consumption and their related undesirable adverse effects and consequently reducing or completely blocking the sympathetic nervous system activation during this procedure. The present study aimed to evaluate the activation of the sympathetic nervous system resulting from adding a ScE injection of bupivacaine 0.25% (0.3 mL kg⁻¹) in feline OVE and identify whether this translates to hemodynamic variables stability.

Material and Methods: Two groups of cats were evaluated in five perioperative times (baseline, T1, T2, T3, and T4), namely, the control group (CG) ($n=18$) with systemic analgesia alone and the sacrococcygeal epidural group (ScEG) ($n=20$) with 0.25% bupivacaine combined with systemic analgesia. Thirty-eight female cats were selected. All animals assigned to CG and ScEG were premedicated with dexmedetomidine (20 µg kg⁻¹ IM) and methadone (0.2 mg kg⁻¹ IM). General anesthesia was induced with propofol IV *ad effectum* and maintained with isoflurane in 100% oxygen. A Parasympathetic Tone Activity (PTA) monitor was applied to detect changes in sympathetic and parasympathetic tone, during the study. Heart rate (HR), non-invasive systolic (SAP) and median blood pressure (MAP), respiratory rate (f_R), and instantaneous parasympathetic tone activity (PTAi) were recorded.

Results: Comparison between groups did not show significant differences in PTAi ($p > 0.05$). HR was significantly higher in CG in the five perioperative times ($p < 0.05$). SAP was significantly higher in CG in T1 ($p = 0.031$) and T2 ($p = 0.007$) and MAP in T1 ($p < 0.038$) The f_R was significantly higher in CG in T2 ($p = 0.039$).

Conclusion: Compared to systemic analgesia alone (CG), sacrococcygeal epidural (ScEG) reduced the rise of common hemodynamic variables but did not prevent sympathetic nervous system activation.

Keywords: Cat, Ovariectiony, Sympathetic nervous system, Sacrococcygeal epidural, Parasympathetic tone activity.