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Multilevel paravertebral nerve blockade for abdominal wall resection in a dog

Hannah E. Leigh, Kerry J. Woodhouse

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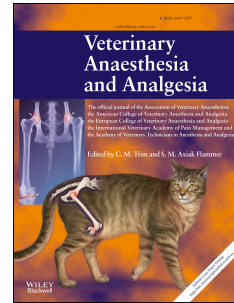
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3 Hannah E. Leigh, Kerry J. Woodhouse

4 Hospital for Small Animals, Royal (Dick) School of Veterinary Studies, Easter Bush

5 Campus, Midlothian. EH25 9RG

6

7 Correspondence: Hannah E Leigh, Hospital for Small Animals, Royal (Dick) School of

8 Veterinary Studies, Easter Bush Campus, Midlothian. EH25 9RG

9 Email: [Hleigh@exseed.ed.ac.uk](mailto:Hleigh@exseed.ed.ac.uk), Telephone: +44(0)131 650 7650, Fax: +44(0)131 650

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12 Author contributions: HL: anaesthetist of the reported case, preparation of the

13 manuscript. KW: critical revision of the manuscript. Both approved the final manuscript

14 for publication.

## 1 LETTER TO THE EDITOR

2 Lumbar paravertebral nerve blockade has been well described in cattle for standing  
3 surgical procedures (Skarda 1996), however there is little published information of this  
4 technique being utilized in dogs. We report the use of multilevel paravertebral nerve  
5 blocks as a local anaesthetic technique in a dog undergoing abdominal wall resection.

6 A 10 year 11 month old cross breed dog weighing 11.6 kg presented for left abdominal  
7 wall resection to remove a large soft tissue sarcoma. Preanaesthetic physical  
8 examination, haematology and blood biochemistry were unremarkable. Computed  
9 tomography imaging revealed a large (8.7 x 8.4 x 6.8 cm) mass visible within the left  
10 internal and external abdominal oblique muscles at the level of L3 to L6. Premedication  
11 with methadone (0.2 mg kg<sup>-1</sup>, Comfortan; Dechra, UK) and acepromazine (0.025 mg  
12 kg<sup>-1</sup>, ACP; Elanco Animal Health, UK) was administered intramuscularly (IM) and an  
13 intravenous (IV) cannula placed in the right cephalic vein 30 minutes later. Anaesthesia  
14 was induced with IV propofol (5.2 mg kg<sup>-1</sup>, Propoflo; Abbott Laboratories, UK), and  
15 following endotracheal intubation with a 7.5 mm cuffed endotracheal tube; was  
16 maintained with isoflurane in oxygen via a circle breathing system. Carprofen was  
17 administered IV (2 mg kg<sup>-1</sup>, Rimadyl; Zoetis, USA).

18 Based on the location of the mass we elected to block the left lumbar nerves L1 to L5 to  
19 desensitize the appropriate dermatomes (Fletcher & Kitchell 1966). The cranio-caudal,  
20 dorso-ventral path that the nerves follow from their exit point at the intervertebral  
21 foramen means the lumbar nerve lies at the caudal edge of the lumbar vertebrae of the  
22 same name (Evans & De Lahunta, 2013). A combination of 2 mg kg<sup>-1</sup> lidocaine solution  
23 (Lidocaine Hydrochloride Injection 2%; Hameln pharmaceuticals, UK) and 2 mg kg<sup>-1</sup>  
24 bupivacaine solution (Marcaine Polyamp Steripack 0.25%; AstraZeneca, UK) was used,

25 resulting in a total volume of 10 mL. This combination was chosen to increase the speed  
26 of onset of the block (Cruz et al. 1997); however combining local anaesthetics in this  
27 way is controversial due to differences in pKa and pH between the solutions. The dog  
28 was positioned in right lateral recumbency and an electrical nerve stimulator was used  
29 for nerve location (Plexygon Nerve Simulator; Vygon, UK) with a 35 mm 23 gauge  
30 insulated needle (Echoplex+; Vygon, UK). Needle insertion was at the caudal edge of  
31 the transverse process of the lumbar vertebrae, perpendicular to the skin in the  
32 horizontal plane. The nerve stimulator was set to deliver a current of 1 mA at 2 Hz, and  
33 the needle advanced slowly until a panniculus reflex was elicited. The current was then  
34 decreased until the motor response was no longer visible at 0.4 mA but returned when  
35 the current was increased. A volume of 2 mL of the local anaesthetic mixture was  
36 injected per site, after first aspirating to ensure no blood was present in the needle hub.  
37 No resistance to injection was encountered.

38 The paravertebral nerve blocks took 10 minutes to perform, and the first surgical  
39 incision made 50 minutes later. An IV infusion of fentanyl (Fentadon; Eurovet Animal  
40 Health, Netherlands) was administered in theatre at a rate of  $5\mu\text{g kg}^{-1}\text{ hour}^{-1}$  as part of a  
41 multimodal analgesic approach, and to provide a centrally mediated MAC sparing  
42 effect. This was reduced to  $4\mu\text{g kg}^{-1}\text{ hour}^{-1}$  60 minutes after the first incision; was  
43 discontinued 70 minutes after this, and surgery finished 20 minutes later. No additional  
44 analgesia was required at any time, heart rate remained between 68 and 85 beats minute<sup>-1</sup>,  
45 mean arterial blood pressure between 60 and 80 mmHg and end tidal isoflurane  
46 concentration (FE Iso) between 0.75 and 1.00%.

47 Postoperatively the dog was assessed using the Glasgow short form composite measure  
48 pain score 30 minutes after extubation once fully recovered, and scored zero. No  
49 further pain scores were recorded as our hospital policy requires an analgesic plan to be

50 made by the anaesthetist and implemented at predetermined times by overnight nursing  
51 staff. Any concerns regarding pain or otherwise are directed to the night intern, and the  
52 anaesthetist called if necessary. The first postoperative dose of methadone ( $0.2 \text{ mg kg}^{-1}$ )  
53 was administered IV 90 minutes after extubation, and subsequently every four hours  
54 overnight. This timing was to ensure that opioid analgesia was adequate when the effect  
55 of the paravertebral block was anticipated to subside. We feel that the nerve block was  
56 successful based on the intraoperative cardiovascular stability, low FE<sub>1</sub>Iso  
57 concentrations, a pain score of zero 30 minutes post extubation, and no requirement for  
58 any intra or postoperative rescue analgesia.

59 We conclude that this technique is suitable for providing local anaesthesia for extensive  
60 abdominal wall surgery in dogs. The use of multilevel paravertebral blocks have been  
61 described for a wide range of procedures in humans, including inguinal hernia repair  
62 (Klein et al. 2002). We therefore feel there are more potential applications for this nerve  
63 block in canine patients, with additional research required to refine the technique and  
64 dose requirements.

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