Remote respiratory rate monitoring of resting dogs

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INTRODUCTION

This paper describes a novel method for non-contact respiratory rate monitoring of resting dogs tested in a clinical setting.

METHODS

15–30 second videos were recorded of dogs in kennels recovering from anaesthesia in a referral hospital setting resting in lateral or sternal recumbency. Videos were loaded on a laptop with custom software for analysis. The software tracked the movement of a manually selected square in the cranial abdomen throughout the video. Signal analysis was then performed on the coordinates of the squares' movement to obtain a respiration rate. Bland-Altman analysis was used to

compare this respiration rate with one obtained visually from the video.

RESULTS

The calculated respiration rates were within ± 4 bpm of the reference method, the predefined interchangeable clinical limits. Bland-Altman analysis had a mean bias of -0.51 breaths per minute (95% CI -1.9 to -0.82 bpm) with limits of agreement (mean ± 2 sd) of -3.5 to 2.5 bpm (95% CI: -2.9 to -4.1 and 3.0 to 1.91).

DISCUSSION

These results show potential for a novel method for non-contact respiration monitoring of dogs, which is interchangeable with the reference method. Developments in non-contact monitoring will be of great benefit in veterinary practice. It provides a method to monitor stressed animals without falsely elevating the respirator rate or disturbing the patient, as well as providing an economical method for continuous monitoring, particularly for animals recovering from anaesthesia or in respiratory distress. To the authors' knowledge this is the first clinical study in the field of non-contact vital sign monitoring.

Loco-regional anaesthesia for pelvic limb orthopaedic surgery: does it prevent recognition of iatrogenic sciatic nerve injury?

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BACKGROUND

Loco-regional anaesthetic techniques have proven anti-nociceptive efficacy for pelvic limb surgery. Clinical responses to epidural (extradural) administration, or perineural injection around the femoral and sciatic nerves are equivalent. Local anaesthetic agents are known to allow differential blockade of nerve fibres but there is no published evidence that 0.5% bupivacaine decreases motor response if the nerve distal to the block is artificially stimulated.

Iatrogenic nerve injury is a reported cause of postoperative sciatic neurapraxia in dogs undergoing pelvic limb surgery, particularly after total hip replacement, and pelvic and femoral fracture fixation. Recognition of inadvertent stimulation of the sciatic nerve intraoperatively may mitigate this risk, and muscle twitch would indicate such stimulation.

OBJECTIVE

To determine the effect on induced motor activity by electrical stimulation of the sciatic nerve distal to the site of local anaesthetic administration in dogs undergoing pelvic limb orthopaedic surgery.

STUDY DESIGN

Prospective randomised blinded case-controlled clinical study.

ANIMALS

22 client-owned dogs undergoing unilateral pelvic limb orthopaedic surgery.

METHODS

Dogs received either a femoral and transgluteal sciatic electrolocation-guided nerve block or a L7–S1 epidural using 0.5% bupivacaine prior to pelvic limb surgery. Motor response to electrical stimulation of branches of the sciatic nerve (at the level of the greater trochanter and distal to the stifle) was tested and the minimum current required to induce muscle twitch recorded prior to local anaesthetic administration. Provided sensory blockade had been deemed successful intraoperatively, testing was repeated postoperatively, with each dog acting as its own control. Paired t-tests were performed to compare pre- and postoperative minimum currents.

RESULTS

Eleven dogs administered epidural and eleven dogs administered femoral and sciatic perineural bupivacaine were eligible for post-operative testing. All dogs displayed normal motor response to electrical stimulation of the sciatic nerve at both sites tested before and after local anaesthetic administration. There was no significant difference in the minimum current required to induce muscle twitch between pre- and postoperative testing ($p=0.31$ sciatic site, $p=0.36$ peroneal site), nor between the two groups using different local anaesthetic techniques (minimum $p=0.13$).

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